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Juvenile Age Estimation Using Cranial Ratios

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By

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Age Estimation Using Cranial Ratios

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Age estimation of juvenile crania can be accomplished with accuracy from dentition. In the absence of dentition there is not a sufficient substitute for reliably establishing age. I offer an alternative means of age estimation using cranial ratios, which are informative because of the differential growth rates of the orbits, facial bones, and cranial vault. I took 40 measurements from 76 crania and statistically analyzed ratio relationships among them to produce equations for age estimation. Accuracy of age estimation using cranial ratios increases with the number of measurements used. Ratios reduce the effect of size differences due to sex, but compound differences due to ancestry. Ratios may be used alone to estimate juvenile age, or in conjunction with dental age estimation for increased accuracy.

Keywords: Age estimation, crania, craniometrics, juvenile, ratio.

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INTRODUCTION

Background

Mammalian neonates have proportionally larger heads, rounder faces, and larger eyes than the adults of their species (Glocker et al., 2009). Lorenz (1943) was the first to suggest that mammal offspring have developed these traits as a means to elicit attention and support from their parents. Evolution of traits that are considered visually appealing and decrease the chance of abandonment would have, in turn, increased the chance of offspring survival (Lorenz, 1943; Hrdy, 1999; Glocker et al., 2009). Glocker et al. (2009) tested this hypothesis and concluded that the presence of these features produces an increase in the perception of "cuteness" and the attention and care-taking desire in adult humans. This response is stronger in females, hypothetically because they are typically the primary caretakers of young, regardless of taxa. Infant facial feature proportions are not only conserved across all mammalian species, but a trait that is found to be universally attractive throughout all human cultures (Greet et al., 2008).

A second theory behind the proportionally larger eyes of mammals at birth is that even subtle changes in the eye may cause loss of focus. The distances between the lens, retina, and other elements of the eye must be in very specific proportion with each other to create a sharp image. As the eye experiences growth in one direction, it must compensate growth in other aspects to maintain proper focus. Theoretically, the less growth the eye experiences, the less chance there is of disturbing these proportions, so the eyes that are the largest fraction of their adult size at birth would be most advantageous (Hess et al., 2006).

Regardless of the reasons behind it, the eye makes up a larger proportion of the head in infants than it does in adults. Normal newborn head circumference varies from 32 to 38cm in girls and 32 to 39cm in boys (Ogden et al., 2002). Because newborns head size is proportional to weight and boys are slightly heavier on average, sex may not be a significant factor at birth (O'Neill, 1961). Head circumference experiences the greatest growth during the first eight weeks, with boys achieving a faster growth rate initially (Westropp and Barber, 1956; O'Neill, 1961; Eichorn and Bayley, 1962). This preliminary growth spurt is followed by continued development at a lesser pace until approximately six months of age, when it notably slows (Eichorn and Bayley, 1962; Ogden et al., 2002).

There is no statistical evidence for a juvenile growth spurt in head circumference between three to five years of age. Support for an adolescent growth spurt, however, is convincing, with females experiencing increased cranial expansion between 11 and 12 years, and males between 14 and 15 years. Female crania continue to grow until around 17 years of age, while male crania continue a slow growth rate until 21 years of age (Eichorn and Bayley, 1962).

Like head growth, eye growth is also logarithmic (Denis et al., 1998; Chau et al., 2004; Bentley et al., 2002), but at a different rate than cranial growth. In neonates, eye measurements are correlated with birth weight (Blomdahn, 1979) and are independent of sex (Denis et al., 1998). During the first three years of life eye growth is rapid, increases steadily from three to ten years of age, and then continues to mature slowly from ten to fifteen years of age. By 16 years of age, orbital growth is complete (Chau et al., 2004). During this time,

however, the volume of the eyeball nearly doubles (Chau et al., 2004), with a 1.7 times increase for males and a 1.8 times increase for females. While male eyes are consistently larger than female eyes, they exhibit the same growth pattern, with females reaching maximum eye size at an earlier age than males (Bentley et al., 2002). The average axial length of the eye at birth is 17mm and reaches 24mm in adulthood (Millodot, 2009). There is no statistical difference between the growth rates of the right and left orbits (Bentley et al., 2002).

Facial proportions also grow at different rates than the cranial vault, although this growth rate has not been explored as well as eye growth. Denis et al. (1998) reported that the vertical axis of the face grows more rapidly than the cranial height until the age of 16, when growth ceases. In that study, the differential growth rate was the same for both males and females.

Cranial bone thickness changes that have been studied through childhood differ between studies and the portion of the skull being measured. Research by Young (1959) reported that most aspects of cranial thickness increase linearly up to 9 months of age, but then decrease at three or four years of age until continuing to increase into adulthood. Male skulls are also typically thicker than female skulls (Roche, 1953; Young, 1959) with the exception of sections of the parietal and occipital bones (Adeloye et al., 1975). Roche (1953) concurs that portions of the skull go through a rapid increase in thickness followed by a decrease, but determines the ages of change to be three years and 12 years, respectively. Sections of the cranium that may provide useful data due to consistent increase in thickness with age include lambda, the vertex, portions of the parietal along the sagittal suture, and

possibly bregma (Roche, 1953; Young, 1959). Overall cranial thickness may also experience an additional increase when an individual reaches their 50s or 60s (Adeloye et al., 1975).

Cranial thickness is the least likely trait to show a linear relationship with eye orbit size across ancestral lines due to the inconsistent nature of measurements between populations; American White males have a thicker frontal bone than American Black males, but thinner parietal and occipital bones (Adeloye et al., 1975). Racial differences have been reported in eye orbit size (Chau et al., 2004), head circumference (Barber and Hewitt, 1956; Westropp and Barber, 1956), and cranial thickness (Adeloye et al., 1975). Not all studies have determined ancestral differences in cranial size. Nellhaus (1968) concluded that there are no significant racial, national, or geographic differences in head circumference size in juveniles.

Approaches to identify age, sex, or other biological factors have turned to index methods. The use of ratios instead of straight measurements is one technique that can allow for the compensation of size differences. Ratios have been used successfully to provide age estimation from pulp to tooth area in human canines (Drusini et al., 1998; Jeevan et al., 2011) and less successful applications of the chilotic line index, ischio-pubic index, and acetabulo-pubic index to estimate age (Pal et al., 2004).

Current methods of Juvenile Age Estimation

There are several age estimation methods currently available for juvenile remains that are more accurate than adult remains, but can be more difficult to accomplish (Saunders, 2008). The most accurate and commonly used of these methods is dental evaluation, including eruption patterns and the neonatal line in infants up to three weeks of age (Smith and Avishai,

2005). There are, however, some drawbacks to dental analysis. The most obvious of these is that mature dentition or tooth buds may be absent due to postmortem loss or the presence of fragmentary remains. Teeth also may not appear accurately on radiographs, causing problematic or incorrect age estimation (Lewis and Flavel, 2006). According to Liversidge and Molleson (2004), dental growth studies lack clearly defined stages of crown and root development. Age estimations based on dentition also have a wide error range of up to five years (Smith, 1991).

Tooth emergence also differs between individuals based on a variety of factors, including sex and ancestry. With deciduous dentition, male tooth eruption can be a month earlier than females. With permanent dentition, females are typically between one and six months ahead of males with most teeth, or up to a year earlier than males with the canines (Lewis and Flavel, 2006). Although dental examination is more accurate when analyzing deciduous teeth (Liversidge and Molleson, 2004), there is still room for error due to individual variation that may lead to a difference in biological and chronological age (Scheuer and Black, 2004). Third molar eruption is particularly variable, leading to the least accurate age estimations after the twelve year molars erupt. Disease, caries, severe malnutrition, and congenital absence can influence accurate dental age estimation (Lewis and Flavel, 2006).

In the absence of dentition, post-cranial age estimations may be used with decreased accuracy. Ossification centers can be useful, but have a wider range of observer error and individual variation than dentition, and epiphyses are rarely recovered with the rest of the skeleton (Scheuer and Black, 2004). Postcranial remains in general are also recovered less than

crania because of poor preservation (Gonzalez et al., 2011). Fragmentary remains have a much higher rate of error when used for age determination, as the interpretation of landmarks can be inconsistent between anthropologists (Hoppa and Gruspier, 1996).

Age estimation may also be conducted on long bone diaphysis length. This method is applicable only when epiphyseal union has not yet occurred and in the absence of postmortem breakage (Scheuer and Black, 2004). Two major problems plague this method, according to Danforth et al. (2009). The first is that the diaphyseal length differs between populations, with different populations showing wide ranges in maximum or minimum height. Ancestry of the individual must be known, and a reference sample must have already been examined so that the individual can be assessed properly. The second problem is that maximum height is subjective to environmental conditions. Improper nutrition or stress, for example, can cause an individual to have shorter stature than they might otherwise achieve. For these reasons, the accuracy of age estimation from the length of the diaphyses can be questionable (Danforth et al., 2009).

As with tooth eruption, sex and ancestry can also create variation in post-cranial skeletal development. Several factors during pregnancy, such as the nutritional status of the mother, smoking, and even noise pollution, can also affect diaphyseal length in newborns (Lewis and Flavel, 2006). With any age estimation, using a single method has a higher likelihood of error so multiple methods should be employed (Chapeskie, 2006).

Factors such as environment, genetics, disease, ancestry, sex, and random individual variation greatly affect growth patterns and make age determination from any aspect of the

skeleton difficult (Scheuer and Black, 2004; Perry, 2006; Lewis and Flavel, 2006). Another major drawback of juvenile aging is that sex estimation is dependent on the age estimation, and vice versa (Saunders, 2008; Hoppa and Gruspier, 1996). Hoppa and Gruspier (1996) suggest that an age estimation method that could circumvent differences between the sexes would be preferable.

Hypotheses

I hypothesize that there is a relationship between the ratio of eye orbit size to cranial size or facial size to cranial size and the age of the individual. Both growth rates are logarithmic, but increase at different rates, with eye size increasing in circumference by a factor of less than 1.4, while head growth increases by a factor of at least 1.6. Therefore, it is possible that these relationships may be able to transcend size differences between sex and ancestral groups, allowing for an age estimate that is independent of either of these factors.

Using raw measurements to investigate these relationships (as opposed to the metric ratio proposed here), would require a known population to provide a comparison for age estimation. Such populations may not exist in the anthropological record, or the individual's ancestry may not be sufficiently known (Perry, 2006). I hypothesize that an age estimation method using an eye orbit or facial size to cranial size ratio will compensate for size differences due to ancestry. Since eye orbit size being proportionally larger at birth and decreasing at a steady rate in comparison to the rest of the cranium is a trait that is highly conserved across species barriers, should also encompass all human populations.

Ideally, an index method would compensate for sex differences, but it might not do so completely. One complication is that males and females often experience growth spurts at different ages. Another is that males tend to experience slow growth for a longer period of time while females mature faster and earlier. If a relationship exists that avoids sex determination to estimate age, it would most likely be prior to 11 years of age when females experience a cranial circumference growth spurt several years before males (Eichorn and Bayley, 1962). Cranial thickness may be more likely to circumvent sex differences throughout childhood, as no growth spurt differences have been reported (Roche, 1953; Young, 1959).

To summarize, I propose the following hypotheses:

- **The ratio of eye orbit size or facial size to overall cranial size reflects age in children up to 16 years of age.**
- **The ratio of eye orbit or facial size to cranial size is equal in both sexes for a given age.**
- **The ratio of eye orbit or facial size to cranial size is equal across ancestries.**

MATERIALS AND METHODS

I endeavored to gather measurements from individuals encompassing a wide range of ages, ancestries, and both sexes. The desired sample size and demographic structure was not possible because juveniles are underrepresented in osteological collections. This is caused by differential burial practices for children, poor preservation of the less dense bones of juvenile skeletons, the decision of parents not to donate their children's remains to science, and immature remains not always being recognized as human during excavation (Hoppa and Gruspier, 1996; Kamp, 2001; Saunders, 2008; Lewis and Flavel, 2006).

I took measurements from two skeletal collections: The Luís Lopes Skeletal Collection from Lisbon, Portugal, and the Hamann-Todd Collection from Cleveland, Ohio. The Luís Lopes Skeletal Collection, also known as the Lisbon Collection, is curated by the Bocage Museum, within the Department of Zoology and Anthropology of the National Museum of Natural History of Portugal. The collection contains 92 subadults, including 43 females and 49 males. The age demographics include 7 females and 12 males between 0 and 1 years of age; 7 females and 12 males between 1 and 5 years of age; 4 females and 5 males between 6 and 10 years of age; 25 females and 20 males between 11 and 20 years of age. Available information for each individual includes the cemetery record number, place of death, individual's name, parent's names, place of birth, age at death, marital status, occupation, address, cause of death, date and hour of death, date and hour of burial, and grave number (Cardoso, 2006).

Only 33 of the 92 Lisbon cases were available for use. Four of these (258, 359, 380, and 389) were not used due to postmortem damage too severe to facilitate measurements and one

(574) was rejected due to lack of documented age. Fourteen males and fourteen females were examined at the Luís Lopes Skeletal Collection, all of European ancestry.

The second collection I visited, the Hamann-Todd Human Collection at the Cleveland Museum of Natural History in Ohio, contains 85 juvenile specimens that include the crania. Of these, I was able to examine 58, but only measured 48. Five individuals (1379, 1509, 1583, 1768, 2141) were not measured because of extensive postmortem damage or missing facial bones. Two more cases (548, 291) were rejected because of age discrepancies in the records. And three more (1606, 1711, 3470) were rejected because of complete obliteration of the sagittal suture. The early suture closure may have restricted cranial growth and lead to atypical measurements for the individual's age. Another specimen (1589) was missing the cranium. The remainder of the available specimens that I did not have time to measure consisted of 19 and 20 year olds. Tables of the individuals and a breakdown of age and ancestry for both collections can be found in Appendix 1.

I considered several other possible collections with juvenile remains, but decided against using them for various reasons. The Scheuer Collection in Dundee, Scotland houses over a hundred juvenile remains, but none of them have documented age or sex (personal email communication from Craig Cunningham, March 5, 2013). The Atkinson collection at the University of the Pacific in San Francisco, California contains a number of juveniles, none of which are documented (personal email communication from Dorothy Dechant, June 12, 2013). The Laboratory of Human Osteology at the University of New Mexico in Albuquerque contains seven documented individuals between the ages of 13 and 20 years of age in addition to a large number of fetal remains (personal email communication from Katelyn Rusk, March 12, 2013),

but does not contain a large enough sample size or a wide enough age range to justify the necessary travel expenses at this time The Bass Collection at the University of Tennessee has 42 documented infant and fetal remains, as well as two teenaged individuals, but does not have a large enough sample size in the variety of ages I required and fetal remains are not the focus of this study. The St. Brides Crypt Skeletal Assemblage, which contains 14 documented subadults (personal email communication from Jalena Bekvalac, March 7, 2013), and the Spitalfields Coffin Plate Collection, which has less than 20 (personal email communication from Robert Kruszynski, April 7, 2013) were also deemed too small.

In total, I was able to measure the crania of 76 juveniles. This included 36 males and 40 females; 40 individuals of African ancestry and 36 individuals of European ancestry. Broken down further, the sample consisted of; 20 White females, 19 Black females, 16 White males, and 21 Black males (Appendix 1).

Methods

I checked the cause of death for each of the individuals before including them in my sample. Measurements were only taken from individuals without obvious cranial deformities and in the absence of certain diseases, as eye orbit to cranial size proportions would not be reliable under a number of medical conditions. Conditions that affect the reliability of eye measurements include congenital anophthalmia, microphthalmia (Gundlach et al., 2005), thyroid problems, neurofibromatosis, blowout fractures (Chau et al., 2004), and Down syndrome (Farkas et al., 1985). Medical conditions affecting the reliability of cranial measurements include hydrocephaly, microcephaly, deformities due to the early fusion of

cranial sutures such as trigonocephaly or scaphocephaly (Friedenwald, 1893), or – more recently – occipital plagiocephaly (Argenta et al., 1996).

Because it was unknown which cranial measurements would best highlight a statistical relationship between eye orbits, facial bones, other cranial landmarks, and age, I took measurements from all aspects of the cranium. Measurements were taken on the right and left sides, where applicable, and the average of the two was used for analyses. I recorded 40 measurements in accordance with definitions by Howells (1973) for the first 25 measurements or cranial landmarks defined by Moore-Jansen et al. (1994) for the remainder (Appendix 2).

Measurements were taken using a Paleo-Tech spreading caliper, with a range of 0-30 cm and an accuracy of 1mm included: g-op, eu-eu, zy-zy, ba-b, ba-pr, and frobcho. The following measurements were taken at the Luis Lopez Collection using a Pittsburgh 8" sliding digital caliper (accuracy of +/-0.02mm), and at the Hamann-Todd Collection using a Mitutoyo model 500-321 sliding digital caliper (accuracy of +/-0.02mm): ecm-ecm, pr-alv, AUB, n-pr, ft-ft, fmt-fmt, n-ns, al-al, d-ec, d-fmt, OBH, ec-ec, d-d, n-b, b-l, l-o, ba-o, FOB, MDH, ASB, ZMB, MOW, m-parhcho, and parbcho. Although consistency of measurement instruments would be preferable, the curator of the Hamann-Todd Collection suggested that I use the museum's Mitutoyo sliding calipers for increased accuracy and speed. Regardless of the brand of sliding caliper used, the calipers were re-calibrated to zero between each measurement. In addition, a rubber band was used to estimate the location of alveolon for the maxillo-alveolar length (pr-alv).

The following measurements were obtained using a Butterfly fiberglass measuring tape, with an accuracy of 1mm: circ, sagarc, froharc, parharc, occipharc, occip arc, m-parharc, and parbarc. I did, however, record to the 0.5mm level when readings appeared to be exactly between two millimeter markers. This measuring tape was not pliable enough to record the eye circumference, so I used a porous string to outline the entire orbital margin. This string was then straightened and the length of it measured against the fiberglass measuring tape. Taking measurements in this manner may not represent the most accurate method of recording eye circumference, but as I employed this method for all of the individuals in my sample, it should not detract from the precision of my calculations. In other words, the error should be the same for all individuals, leading to consistency in the eye circumference to age relationship.

I took each cranial measurement twice, at separated times. In this manner, I was hoping to avoid accidental user error in the measurements by inadvertently using the same exact point I had just used. This time in between the two measurements for each point required me to reevaluate where to place the measuring device as though it were the first time. The average of these two measurements was used for the final graphs and calculations. If the two measurements differed by more than 1mm, I took the measurements again until I was able to obtain a consistent number three times. The statistical difference between my first and second set of measurements was analyzed in SPSS using a paired samples t-test to evaluate intraobserver error. I also recorded detailed information about each cranium's condition, postmortem damage, missing bones, disarticulation, and anomalies that might affect accurate measurements or explain outliers. The raw data from both collections and well as the descriptions can be found in Appendix 3.

In some cases, postmortem damage required a slight alteration of my methods. For measurements with a right and left side, such as eye circumference, eye orbit width, eye orbit height, and measurements of the parietal bone, the average of the two sides was used in calculations. If one side was missing or damaged, I included only one side instead of the average. Often, the temporals would be disarticulated or pulled away from the parietals. In these cases, I measured the mid-parietal height and arc from the middle of the sagittal suture to the edge of the coloration and texture change on the parietal that typically signifies the location of the temporal suture line.

Once the data were collected, I plotted each of the cranial measurements against age in Microsoft Excel to visualize which measurements had the highest growth rate (Appendix 4) and used trendline options to determine the slope of the lines. I used only natural logarithmic equations because it is biologically reasonable to assume that both growth rates and ratios of growth rates would level off at a certain point and eventually achieve a zero slope when graphed (Bogin, 1999).

I then used the IBM SPSS Statistics 22.0 program to calculate the correlation and 2-tailed significance of each of the measurements to each other in relationship with age, which resulted in 1600 correlations (Appendix 5). Because of the impracticality of analyzing all 1,600 relationships, I then extracted the relationships with the highest correlation and the lowest significance to use in further analyses. In addition, I included measurement combinations that I thought might be useful or that included cranial landmarks most often intact even when postmortem damage causes absent dentition, resulting 41 ratios used in my final analyses

(Appendix 6). Ratios were plotted against age using Microsoft Excel 2013. The ratios selected and the R^2 values for the straight measurements and the ratios can be found in Appendix 8.

Finally, I used statistical analysis methods in SPSS to evaluate all of the ratios and their correlation to age. I used a multiple linear regression to determine an equation that best fit the data and would be able to estimate age based on my samples. As this resulted in an 18-term equation that would not be easy and user-friendly without the aid of a computer program, I then ran the data through a stepwise linear regression in SPSS in an attempt to pare the equation down to a more manageable length. The stepwise function picked the most statistically viable ratio, then continued to combine additional ratios – one at a time – to increase the model's fit, up to seven terms.

In order to ascertain whether an index method was able to circumvent size differences due to sex and ancestry, I separated the raw data by sex (Appendix 9) and ancestry categories (Appendix 10). Both the raw measurements and the ratio values were averaged by age to approximate age mid-points, and plotted in Microsoft Excel 2013. I applied an independent samples *t*-test for sex and ancestry categories in SPSS to determine which raw measurements and ratios were statistically significant between the groups.

RESULTS

All of the analyses of raw measurements show biologically expected growth with age (Appendix 4). The three measurements with the highest r^2 values include, nasal height/n-ns (0.78), upper facial height/n-pr (0.7793), and max alveolar length/pr-alv (0.7768). The three measurements with the largest growth rates include circumference/circ (25.924), bizygomatic breadth/zy-zy (18.667), and biauricular breadth/AUB (14.761). Of the chosen cranial ratios, the top three r^2 values include: n-ns/circ (0.7198), n-ns/eu-eu (0.7091), and n-ns/g-op (0.6721). The three largest slope values are represented by: ft-ft/pr-alv (0.231), n-pr/d-fmt (0.1348), and ft-ft/ba-pr (0.122). The analysis of the differences between my first and second measurements of each cranium resulted in a 2-tailed significance of 0.00 and a correlation of 1.000.

The multiple regression yielded a multiple correlation with age of 1.0 (R^2 of 1) using 17 ratios as independent variables. These ratios, their coefficients, and standard errors are listed in Table 1. Both predicted age (Figure 1) and the unstandardized residuals (Figure 2) were plotted against actual age for a visual representation. The multiple regression formula is: **Age = 51.744 - 93.508(ft-ft/zy-zy) + 3.179(ec-ec/ba-pr) - 10.642(d-d/ft-ft) – 3.915(circ/g-op) + 54.621(fmt-fmt/eyecirc) + 159.138(d-fmt/ba-b) – 124.930(d-fmt/eyecirc) + 23.134(d-fmt/AUB) + 5.354(ft-ft/ZMB) + 2.213(ft-ft/frobcho) – 1.937(n-pr/ASB) – 33.324(pararc/sagarc) + 1.399(ft-ft/ecm-ecm) + 15.845(n-pr/eyecirc) – 2.359(ft-ft/pr-alv) + 3.058(ft-ft/MOW) – 25.963(ft-ft/parharc)**

Table 1: Coefficients for the 17 ratios used in the estimation of age by multiple regression.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	51.744	.000		.	.
	ftftoverzyzy	-93.508	.000	-.909	.	.
	ececoverbapr	3.179	.000	.054	.	.
	ddoverftft	-10.642	.000	-.068	.	.
	CircoverGOP	-3.915	.000	-.065	.	.
	fmtoverLeyecirc	54.621	.000	.429	.	.
	dfmtavgoverbab	159.138	.000	.599	.	.
	dfmtovereyecircavg	-124.930	.000	-.220	.	.
	dfmtoverAUB	23.134	.000	.077	.	.
	ftftoverZMB	5.354	.000	.094	.	.
	ftftoverFroBCho	2.213	.000	.032	.	.
	nproverASB	-1.937	.000	-.080	.	.
	pararcoversagarc	-33.324	.000	-.100	.	.
	ftftoverecm	1.399	.000	.034	.	.
	nprovereyecirc	15.845	.000	.187	.	.
	ftftoverpralv	-2.359	.000	-.120	.	.
	ftftoverMOW	3.058	.000	.163	.	.
	ftftoverParHArc	-25.963	.000	-.249	.	.

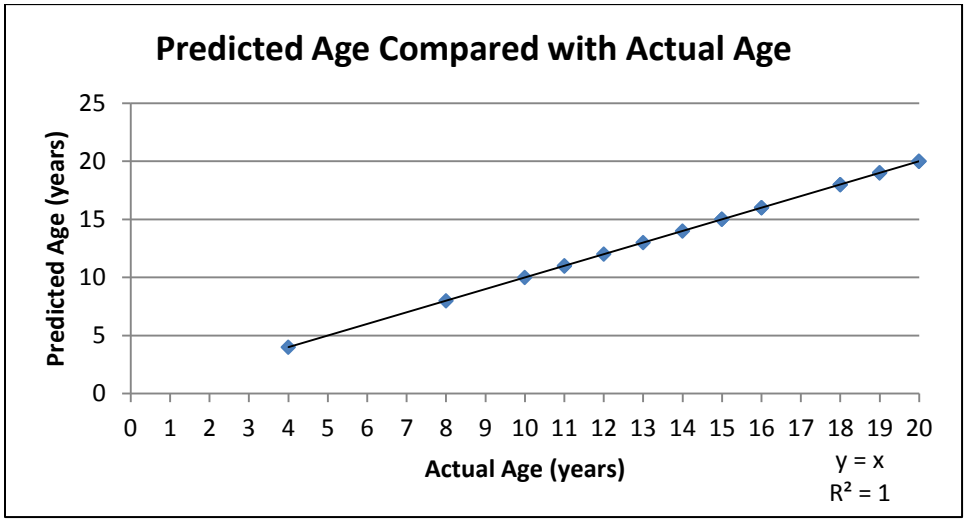

Figure 1: Comparison of Predicted Age with Actual Age

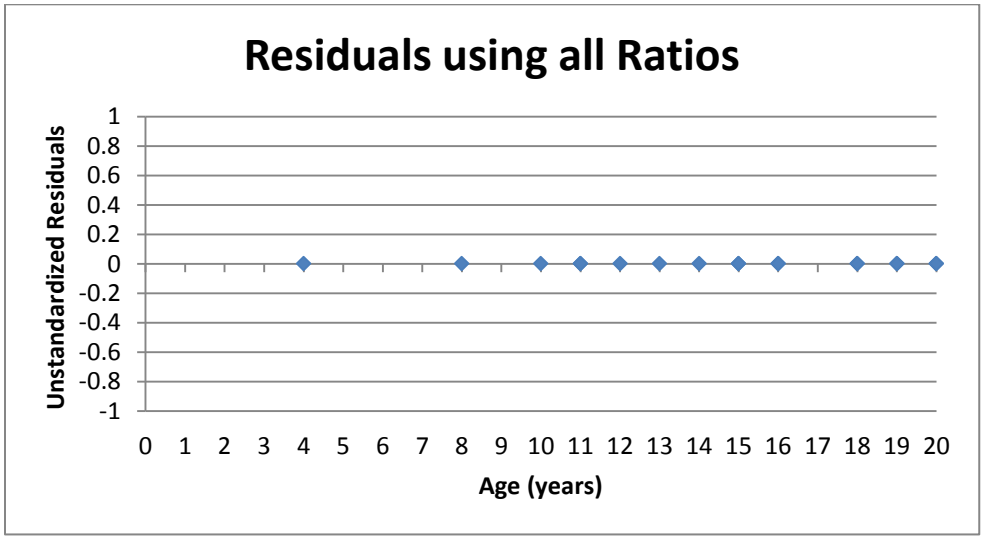

Figure 2: Residuals

Stepwise multiple regression identified an estimation function that uses only 7 ratios necessary for age estimations. These include: n-ns/eu-eu, n-pr/circ, n-pr/ASB, n-pr/n-b, n-pr/frobcho, ft-ft/ecm-ecm, and eyecirc/fmt-fmt. As expected, the majority of these best-fit ratios pair an orbital or facial measurement with a cranial vault measurement. The correlation increases and standard error decreases with the addition of more terms to the equation (Table

2). A visual representation can be seen in Figure 3 and the plot of the residuals in Figure 4. Some variation can be accounted for due to the aforementioned lack of precision in the data stemming from documented age in years only. Tables of the actual age and predicted age using both linear regression and step-wise regression can be found in Appendix 11.

The following seven equations, followed by their respective R^2 and Standard Error values, may also be used for the sake of simplicity or when missing cranial landmarks necessary for complete measurements.

1. **Age = -17.586 +91.632(n-ns/eu-eu)** R^2 = .975 and SE = 1.012
2. **Age = -20.123 + 59.091(n-ns/eu-eu) + 108.131(n-pr/circ)** R^2 = .972 and SE = .787
3. **Age = -20.644 + 56.218(n-ns/eu-eu) + 134.166(n-pr/circ) – 2.884(n-pr/ASB)** R^2 = .982 and SE = .651
4. **Age = -18.264 + 65.171(n-ns/eu-eu) + 194.136(n-pr/circ) – 3.095(n-pr/ASB) – 22.097(n-pr/n-b)** R^2 = .990 and SE = .505
5. **Age = -19.854 + 65.447(n-ns/eu-eu) + 166.953(n-pr/circ) - 2.877(n-pr/ASB) - 23.748(n-pr/n-b) + 9.270(n-pr/frobcho)** R^2 = .994 and SE = .397
6. **Age = -16.492 + 63.469(n-ns/eu-eu) + 153.135(n-pr/circ) – 2.919(n-pr/ASB) – 23.275(n-pr/n-b) + 13.980(n-pr/frobcho) - 2.579(ft-ft/ecm-ecm)** R^2 = .997 and SE = .297
7. **Age = -12.789 + 64.625(n-ns/eu-eu) + 151.083(n-pr/circ) – 3.127(n-pr/ASB) – 22.022(n-pr/n-b) + 13.734(n-pr/frobcho) – 2.706(ft-ft/ecm-ecm) – 3.373(eyecirc/fmt-fmt)** R^2 = .998 and SE = .254

Table 2: Model summary for stepwise multiple regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.975[a]	0.951	0.948	1.012
2	.986[b]	0.972	0.969	0.787
3	.991[c]	0.982	0.979	0.651
4	.995[d]	0.99	0.987	0.505
5	.997[e]	0.994	0.992	0.397
6	.999[f]	0.997	0.996	0.297
7	.999[g]	0.998	0.997	0.254

a. Predictors: (Constant), nnsovereueu
b. Predictors: (Constant), nnsovereueu, nprovercirc
c. Predictors: (Constant), nnsovereueu, nprovercirc, nproverASB
d. Predictors: (Constant), nnsovereueu, nprovercirc, nproverASB, nprovernb
e. Predictors: (Constant), nnsovereueu, nprovercirc, nproverASB, nprovernb, nproverFroBCho
f. Predictors: (Constant), nnsovereueu, nprovercirc, nproverASB, nprovernb, nproverFroBCho, ftftoverecm
g. Predictors: (Constant), nnsovereueu, nprovercirc, nproverASB, nprovernb, nproverFroBCho, ftftoverecm, eyecircoverfmt

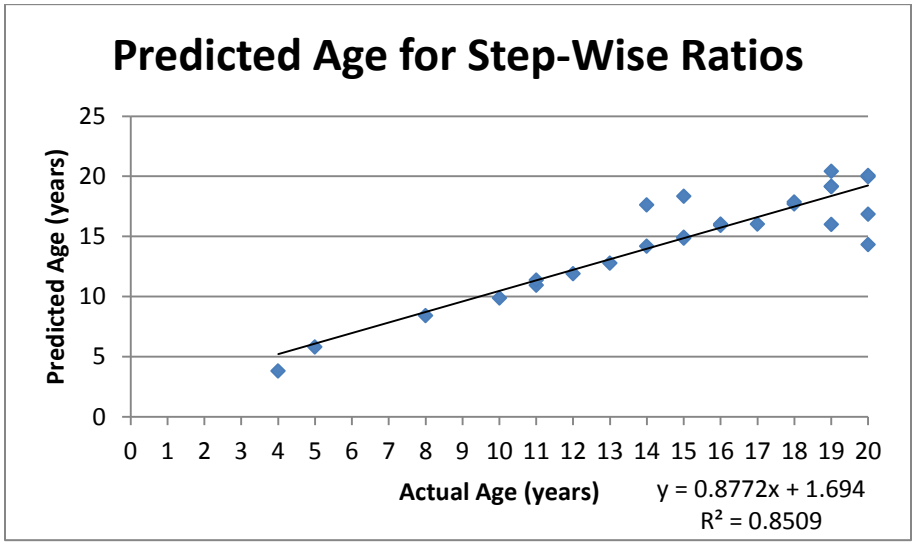

Figure 3: Plot of Predicted Age vs. Actual Age for the ages predicted using the multiple regression equation number 7.

Table 3: Coefficients for the 7 ratios used by the stepwise regression procedure with the significances of the correlations.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-17.586	1.824		-9.641	0
	nnsovereueu	91.632	5.183	0.975	17.68	0
2	(Constant)	-20.123	1.606		-12.527	0
	nnsovereueu	59.091	10.446	0.629	5.657	0
	nprovercirc	108.131	32.018	0.376	3.377	0.004
3	(Constant)	-20.644	1.34		-15.403	0
	nnsovereueu	56.218	8.692	0.598	6.468	0
	nprovercirc	134.166	28.022	0.466	4.788	0
	nproverASB	-2.884	1.022	-0.118	-2.822	0.014
4	(Constant)	-18.264	1.277		-14.298	0
	nnsovereueu	65.171	7.298	0.694	8.93	0
	nprovercirc	194.136	28.68	0.674	6.769	0
	nproverASB	-3.095	0.795	-0.127	-3.891	0.002
	nprovernb	-22.097	6.895	-0.307	-3.205	0.007
5	(Constant)	-19.854	1.136		-17.472	0
	nnsovereueu	65.447	5.743	0.697	11.396	0
	nprovercirc	166.953	24.319	0.58	6.865	0
	nproverASB	-2.877	0.63	-0.118	-4.565	0.001
	nprovernb	-23.748	5.453	-0.33	-4.355	0.001
	nproverFroBCho	9.27	3.09	0.127	3	0.011
6	(Constant)	-16.492	1.346		-12.25	0
	nnsovereueu	63.469	4.345	0.676	14.607	0
	nprovercirc	153.135	18.713	0.532	8.184	0
	nproverASB	-2.919	0.472	-0.12	-6.182	0
	nprovernb	-23.275	4.087	-0.323	-5.695	0
	nproverFroBCho	13.98	2.737	0.192	5.107	0
	ftftoverecm	-2.579	0.8	-0.063	-3.223	0.008
7	(Constant)	-12.789	2.009		-6.366	0
	nnsovereueu	64.625	3.749	0.688	17.237	0
	nprovercirc	151.083	16.019	0.525	9.431	0
	nproverASB	-3.127	0.414	-0.128	-7.553	0
	nprovernb	-22.022	3.537	-0.306	-6.225	0
	nproverFroBCho	13.734	2.342	0.188	5.864	0
	ftftoverecm	-2.706	0.686	-0.066	-3.944	0.003
	eyecircoverfmt	-3.373	1.5	-0.036	-2.249	0.048

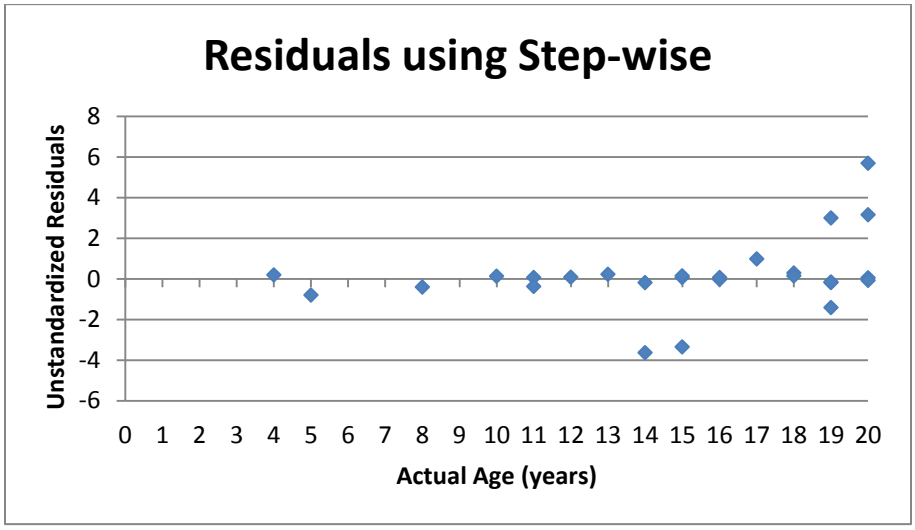

Figure 4: Plot of residuals vs. age using the multiple regression equation number 7.

Sex Analyses

Overall, raw measurements showed expected size differences between males and females, with males exhibiting generally larger crania. I ran an independent samples t-test in SPSS to determine differences in both cranial size and cranial ratios between males and females. For the raw measurements, 25% of the measurements (10 out of 40) showed statistically significant ($P < 0.05$) differences between the sexes. These include g-op, zy-zy, ba-b, ba-n, ba-p, AUB, ba-o, circ, sagarc, and parharc. None of the ratios were statistically different between males and females. Complete SPSS analyses of sex can be found in Appendix 9.

Ancestry

In general, the raw measurements showed expected size differences between ancestries that are consistent with commonly recognized ancestry features of the cranium. For example, nasal width (al-al) was slightly higher in Black individuals, while nasal height (n-ns) was slightly higher in White individuals.

Eight raw measurements out of 40 showed statistically significant ($P < 0.05$) differences between Black and White individuals. These measurements include d-d, b-l, ba-o, FOB, MOW, occiparc, parharc, and parbarc. For the ratios, well over half of the relationships I looked at exhibited statistically significant differences between the two ancestries. These 28 ratios include: n-ns/g-op, n-ns/circ, ec-ec/zy-zy, ec-ec/d-d, d-d/ft-ft, d-fmt/AUB, d-fmt/ft-ft, d-fmt/ec-ec, n-pr/g-op, d-fmt/zy-zy, n-pr/sagarc, eyecirc/ec-ec, d-fmt/eyecirc, d-fmt/AUB, ft-ft/frobcho, d-fmt/ft-ft, pararc/sagarc, n-pr/ft-ft, n-pr/d-fmt, n-pr/ec-ec, n-pr/eyecirc, ft-ft/g-op, ft-ft/d-ec, ft-ft/d-fmt, ft-ft/MOW, ft-ft/circ, ft-ft/eyecirc, and n-ns/eyecirc. Complete SPSS analysis of ancestry differences can be found in Appendix 10. Seven of these ratios that exhibit ancestral differences were used in the final regression equation (d-d/ft-ft, d-fmt/eyecirc, d-fmt/AUB, ft-ft/FroBCho, ParArc/SagArc, n-pr/eyecirc, ft-ft/MOW).

DISCUSSION

The raw data of this study supported biological expectations of human cranial growth. In accordance with other research (Westropp and Barber, 1956; O'Neill, 1961; Eichorn and Bayley, 1962; Denis et al., 1998; Chau et al., 2004; Bentley et al., 2002; Ogden et al., 2002), cranial vault measurements showed the largest growth, while eye measurements exhibited the least amount of growth. It was important that my raw data upheld these basic assumptions. If that were not the case, further analyses would be pointless.

Raw measurements exhibit too much size variation to be used for age estimation. Although cranial ratios show a clear relationship with the age of the individual, the use of a single ratio for age estimation cannot be accomplished with any accuracy, due to the overlap of measurements for each age. Further analysis of the data, however, shows that the utilization of multiple cranial ratios does have a statistically significant relationship with age and may be useful for age estimation. The more ratios used, the higher the accuracy of estimation.

I hypothesized that using ratios instead of raw measurements might negate size differences due to sex and ancestry. This was found to be true with sex. While differences due to sex were common in raw measurements, there were nonexistent in the ratio analyses. Ancestry analyses of ratio, however, had the opposite effect. The differences between Black and White individuals were exaggerated by using ratios, nearly quadrupling the percentage of measurements that showed statistical differences.

The extremely high accuracy of the multiple regression formula was unexpected and may be due to the nature of the sample. The formula should not be expected to give a perfect estimation of age with individuals who were not part of the original sample.

The ratio method proposed here may prove to be more consistent than some currently available dental age estimation methods. For example, permanent tooth length has been shown to have a 95% confidence rate within 0.17 years but with overestimation of age in individuals under 6 years old and decreased accuracy as age increases (Cardoso, 2009). Another study by Cameriere et al. (2012) measures the open apices in tooth roots, with an accuracy of 0.62 years for females and 0.71years for males between 5 and15 years old. Tooth development methods are fairly accurate within their reference samples, but do not hold up as well under independent testing. Liversidge et al. (2010) tested age estimate methods based on developing dentition in 946 individuals and found that even the most accurate method only had a 71% accuracy rate to predict age within 10% of the actual age. A tooth calcification method by Acharya (2010) resulted in an over 9% error rate.

As the primary objective of this study was to develop a juvenile age assessment method that could be used in the absence of dentition, its comparison with non-dental methods is perhaps a more worthwhile endeavor. Epiphysis fusion has been shown to be less accurate than the proposed method, with wide variation in age estimates: 4-6 year span for ulnar fusion, 5-7 year span for radial fusion, 7 year span for the humerus, and up to 9 years for the scapula (Cardoso, 2008). A method proposed by Cameriere et al. (2012) claims that a ratio the total area of carpal bones with the epiphyses of the ulna and radius can predict age within 1 year of

the chronological age. The obvious disadvantage is that it is only applicable if all carpal bones and epiphyses are recovered, and such small bones are frequently lost.

Shortcomings

Although I strived for accuracy through every step of this research, there were several issues that might have introduced error into my study. As previously mentioned, the most significant of these issues is the lack of precise ages for the individuals in my sample. Some ages did not have enough individuals to obtain a statistically viable representation. Another problem arises from having a smaller sample size than is desirable. Although this seems to be a chronic characteristic of any anthropological study, it is compounded by the lack of documented juvenile crania available in osteological collections. Some ages were severely underrepresented in my data set. In particular, there were no 9 year olds and only one 17 year old available for measurement in the collections I used. The condition of many of the crania I examined also disallowed the measurement of many cranial aspects, further reducing the data sample size. This problem became more complex as I attempted to break down the already sparse data into sex and ancestry categories.

Furthermore, I lumped all individuals of European ancestry into a single category. As there may be a difference in cranial shape between American Whites and European Whites, this may have introduced some error into the data. There was not, however, a large enough sample size of either to warrant dividing the White individuals into two groups.

Lastly, it was my hope that age estimation using cranial ratios could be used on fragmentary remains, either breakage due to postmortem damage or disarticulation due to lack

of fusion. This does not appear to be the case. The measurements that create the most reliable ratios for age estimation require the cranium to be entirely or mostly intact and articulated.

Future Research

This study opens up several possibilities for future research. The most obvious is to perform tests with individuals from other collections to see whether these equations only work for this data set or can be generalized. Another is to simply examine all other aspects of the ratios that were rejected here in the interest of time and effort. A similar study using juvenile crania where the exact age can be calculated in months, weeks, or days could yield more effective results. Cranial ratio studies could also be expanded to include additional ancestries or even additional time periods to see if historic or prehistoric individuals exhibit similar ratios that can be used for aging.

While it had originally been my intent to assess cranial thickness as a means of age assessment, the tools available to me were not accurate enough to facilitate that aspect of my goals. Research in this direction using more sensitive calipers may prove fruitful. Furthermore, duplicating this study using more advanced technology for cranial measurements such as a digitizer, CT or LASER scanning may yield more useful information on the three dimensional relationships of the cranium. Extrapolating the ideas presented here to include the use of cranial to post-cranial ratios could be effective as a means of juvenile age estimation. The exploration of the reasons behind the exaggeration of ancestral measurements may provide to be another outlet for ancestry estimation.

Finally, more extensive research on these cranial relationships could be done in the hope of obtaining more streamlined and simple age estimation. The program could be designed to use available measurements in the most statistically reliable combination. The user would simply input what measurements they were able to obtain given the condition of the crania, and the program would output a best-fit age estimation based on the ratios it was able to calculate, along with an error range.

CONCLUSION

Cranial ratio relationships may be able to provide an alternate means of age estimation for juvenile remains. This is extremely important in the absence of dentition, where other age estimation methods such as cranial suture closure are fraught with error or very wide estimations. When used in conjunction with dentition, however, cranial ratios may add to the accuracy or significance of the age estimation.

The use of a single cranial ratio for age estimation has not been shown to be highly accurate, but may provide a good starting point. Using a large number of ratios in calculations for age estimation is more accurate, but also more complicated and time consuming if done by hand. Cranial ratios have the added benefit of negating size differences due to sex, creating an age estimation that can be accomplished when sex of the individual is unknown. Differences in cranial dimensions due to ancestry, however, seem to be exaggerated by this method.

To summarize:

- **The ratio of eye orbit size or facial size to overall cranial size reflects age in children up to 16 years of age.** This hypothesis was supported; a larger number of cranial ratios provides increased accuracy.
- **The ratio of eye orbit or facial size to cranial size is equal in both sexes for a given age.** This hypothesis was supported; the use of ratios compensates for size differences due to sex.
- **The ratio of eye orbit or facial size to cranial size is equal across ancestries.** This hypothesis was not supported; the use of cranial ratios exaggerates ancestral differences.

Appendix 1: Demographics of the specimens used in this study, separated by age, sex, and ancestry.

Table 4: Demographics of Luis Lopes Collection

Luís Lopes Skeletal Collection					
Age	Total	Male	Female	Black	White
1	1	1	0	0	1
2	3	2	1	0	3
3	1	0	1	0	1
4	4	3	1	0	4
5	3	1	2	0	3
6	1	0	1	0	1
7	1	1	0	0	1
11	2	0	2	0	2
13	1	1	0	0	1
14	1	0	1	0	1
15	3	1	2	0	3
18	2	1	1	0	2
19	2	1	1	0	2
20	3	2	1	0	3
TOTAL	**28**	**14**	**14**	**0**	**28**

Table 5: Demographics of Hamann-Todd Collection

Hamann-Todd Human Osteological Collection					
Age	Total	Male	Female	Black	White
1	6	5	1	6	0
2	1	0	1	1	0
3	1	0	1	1	0
4	2	1	1	2	0
5	2	0	2	2	0
6	3	2	1	3	0
7	1	0	1	0	1
8	4	1	3	4	0
9	0	0	0	0	0
10	4	3	1	4	0
11	2	1	1	2	0
12	3	0	3	0	3
13	1	0	1	1	0
14	2	0	2	2	0
15	2	2	0	2	0
16	4	0	4	3	1
17	1	0	1	1	0
18	5	4	1	4	1
19	2	2	0	1	1
20	2	1	1	1	1
TOTAL	**48**	**22**	**26**	**40**	**8**

Appendix 2: Cranial Measurements Taken and Their Descriptions. The first 25 measurements are in accordance with Howells (1973) and the remaining using landmarks as defined by Moore-Jansen et al. (1994).

- Maximum Length (g-op): Direct maximum distance from glabella to opisthocranion
- Maximum Breadth (eu-eu): Direct maximum distance between right and left euryon
- Bizygomatic Breadth (zy-zy): Direct maximum distance between right and left zygion
- Basion-Bregma Height (ba-b): Direct distance between basion and bregma
- Cranial Base Length (ba-n): Direct distance between basion and nasion
- Basion-Prosthion Length (ba-pr): Direct distance from basion to prosthion
- Maxillo-Alveolar Breadth (ecm-ecm): Direct maximum breadth between right and left ectomolare
- Maxillo-Alveolar Length (pr-alv): Direct distance from prosthion to alveolon
- Biauricular Breadth (AUB): Direct minimum distance between right and left auriculare
- Upper Facial Height (n-pr): Direct distance from nasion to prosthion
- Minimum Frontal Breadth (ft-ft): Direct minimum distance between right and left frontotemporale
- Upper Facial Breadth (fmt-fmt): Direct distance between right and left frontomalare temporale
- Nasal Height (n-ns): Direct distance from nasion to nasospinale
- Nasal Breadth (al-al): Direct maximum distance between right and left alare
- Orbital Breadth (d-ec): Direct distance from dacryon to ectoconchion, both right and left
- Dacryon-Frontomalare Temporale (d-fmt): Direct distance from dacryon to frontomalare, both right and left

- Orbital Height (OBH): Direct distance between superior and inferior orbital margins, both right and left
- Biorbital Breadth (ec-ec): Direct distance between right and left ectoconchion
- Interorbital Breadth (d-d): Direct distance between right and left dacryon
- Frontal Chord (n-b): Direct distance from nasion to bregma
- Parietal Chord (b-l): Direct distance from bregma to lambda
- Occipital Chord (l-o): Direct distance from lambda to opisthion
- Foramen Magnum Length (ba-o): Direct distance from basion to opisthion
- Foramen Magnum Breadth (FOB): Direct distance between lateral margins of the foramen magnum
- Mastoid Height (MDH): Length of the mastoid process below and perpendicular to the eye-ear plane, both right and left (Howells, 1973)
- Biasterion Breadth (ASB): Direct distance between right and left asterion
- Zygomaxillary Breadth (ZMB): Direct distance between the right and left inferior points of the zygomaxillary suture
- Mid-Orbital Width (MOW): Direct distance between the right and left superior points of the zygomaxillary suture
- Cranial Circumference (circ): Distance around the greatest protuberances of the occipital and frontal areas, perpendicular to the mid-sagittal plane (Falkner 1958; Eichhorn and Bayley 1962).
- Sagittal Arc (sagarc): Measurement of the maximum arc between nasion and opisthion along the sagittal plane.

- Frontal Height Arc (froharc): Measurement of the maximum arc between nasion and bregma along the sagittal plane
- Parietal Height Arc (parharc): Measurement of the maximum arc between bregma and lambda along the sagittal plane
- Occipital Height Arc (occipharc): Measurement of the maximum arc between lambda and opisthion in the sagittal plane.
- Eye Orbit Circumference (eyecirc): Distance around entire orbital margin, both right and left
- Occipital Breadth Arc (occiparc): Measurement of maximum arc between lateral margins of the occipital
- Mid-Parietal Height Arc (m-parharc): Measurement of the arc from midway along the sagittal suture to midway along the squamosal suture, both right and left
- Mid-Parietal Height Chord (m-parhcho): Direct distance from midway along the sagittal suture to midway along the squamosal suture, both right and left
- Parietal Breadth Arc (parbarc): Measurement of the arc from midway along the coronal suture to midway along the lambdoidal suture, both right and left
- Parietal Breadth Chord (parbcho): Direct distance from midway along the coronal suture to midway along the lambdoidal suture, both right and left
- Frontal Breadth Chord (frobcho): Direct maximum distance between the lateral borders of the frontal

Appendix 3: Raw Data for Measurements, Including Both Measurements, Their Averages, and Descriptions of the Crania.

			MISS = Missing						
Luis Lopez Osteological Collection			UNF= Unfused						
Bocage Museum, Lisbon.			PMD = Post Mortem Damage						
			Red Fill = Accuracy of Measurement in Question						
Specimen ID	**Sex**	**Age (years)**	**Ancestry**	**Year Died**	**Cause of Death**	**#**	**g-op**	**eu-eu**	**zy-zy**
LL8	F	18	E	1931	Acute Gracilis Tuberculosis	1	169	132	121
						2	168	132	120
						Avg	168.5	132	120.5
LL39	F	19	E	1924	Pulmonary TB	1	172	129	111
						2	173	129	111
						Avg	172.5	129	111
LL81	M	1	E	1938	Dystrophy	1			
						2			
						Avg	PMD	PMD	PMD
LL83	F	14	E	1931	TB	1	176	131	
						2	175	131	
						Avg	175.5	131	PMD
LL204	F	15	E	1947	Chronic myocarditis	1	171	129	
						2	171	129	
						Avg	171	129	PMD
LL221	F	20	E	1941	TB	1	170	131	
						2	170	131	
						Avg	170	131	PMD
LL291	M	13	E	1934	Polyserositis	1	169	138	120
						2	170	137	120
						Avg	169.5	137.5	120
LL301	M	20	E	1952	TB	1	175	130	119
						2	175	130	119
						Avg	175	130	119
LL336	M	15	E	1945	Appendicitis	1	186	142	122
						2	187	142	122
						Avg	186.5	142	122
LL338	F	5	E	1917	Meningitis	1	152	118	
						2	153	118	
						Avg	152.5	118	UNF
LL347	F	2	E	1944	Pnemonia	1			
						2			
						Avg	PMD	PMD	PMD
LL365	F	11	E	1947	TB Meningitis	1	161	135	108
						2	161	135	108
						Avg	161	135	108
LL369	M	2	E	1951	TB Meningitis	1		124	
						2		124	
						Avg	PMD	124	PMD
LL371	M	4	E	1940	Bacterial Meningitis	1			
						2			
						Avg	PMD	PMD	PMD
LL385	M	7	E	1943	Septecemia	1			
						2			
						Avg	PMD	PMD	PMD

Specimen ID	Sex	Age (years)	Ancestry	Year Died	Cause of Death	#	g-op	eu-eu	zy-zy
LL391	M	20	E	1945	TB	1	189	136	128
						2	189	136	129
						Avg	189	136	128.5
LL392	F	3	E	1948	TB	1			
						2			
						Avg	UNF	UNF	UNF
LL394	M	19	E	1941	TB	1	194	139	121
						2	194	139	121
						Avg	194	139	121
LL402	F	4	E	1949	Rheumatism	1			
						2			
						Avg	UNF	UNF	UNF
LL452	F	15	E	1903	TB	1	167	133	113
						2	167	132	113
						Avg	167	132.5	113
LL466	M	2	E	1923	TB	1	160	128	
						2	159	129	
						Avg	159.5	128.5	PMD
LL516	F	11	E	1919	TB Meningitis	1	162	133	105
						2	161	132	105
						Avg	161.5	132.5	105
LL521	F	6	E	1927	TB Meningitis	1		137	
						2		137	
						Avg	UNF	137	UNF
LL522	M	4	E	1938	TB Meningitis	1			
						2			
						Avg	PMD	PMD	UNF
LL600	M	5	E			1			
						2			
						Avg	PMD	PMD	PMD
LL684	M	18	E	1930	Tisica Galopante	1	167	135	120
						2	167	135	120
						Avg	167	135	120
LL719	F	5	E	1944	Meningitis TB	1	169	132	
						2	168	132	
						Avg	168.5	132	PMD
LL740	M	4	E	1954	Polio	1			
						2			
						Avg	PMD	PMD	PMD

Specimen ID	#	ba-b	ba-n	ba-pr	ecm-ecm	pr-alv	AUB	n-pr	ft-ft	fmt-fmt
LL8	1	131	92	92	66	54	112	68	91	98
	2	131	92	91	66	54	112	67	91	98
	Avg	131	92	91.5	66	54	112	67.5	91	98
LL39	1	131	94	91	53	53	104	68	84	93
	2	131	94	90	53	53	104	67	84	92
	Avg	131	94	90.5	53	53	104	67.5	84	92.5
LL81	1				45	33			80	77
	2				46	32			80	77
	Avg	PMD	PMD	PMD	45.5	32.5	PMD	PMD	80	77
LL83	1	128	96	94	55	54	116	70	97	100
	2	128	97	94	56	53	115	70	96	100
	Avg	128	96.5	94	55.5	53.5	115.5	70	96.5	100
LL204	1	128	96	91	52	47	115	71	96	97
	2	129	95	92	52	46	114	70	96	97
	Avg	128.5	95.5	91.5	52	46.5	114.5	70.5	96	97
LL221	1	125	92				111		90	91
	2	126	93				110		90	91
	Avg	125.5	92.5	PMD	PMD	PMD	110.5	PMD	90	91
LL291	1	127	96	87	60	44	120	60	95	97
	2	128	97	87	60	44	120	60	95	97
	Avg	127.5	96.5	87	60	44	120	60	95	97
LL301	1	132	96	89	56	47	111	69	88	98
	2	131	97	89	56	47	112	69	87	98
	Avg	131.5	96.5	89	56	47	111.5	69	87.5	98
LL336	1	135	99	97	61	54	118	73	95	100
	2	136	99	98	62	53	119	72	95	100
	Avg	135.5	99	97.5	61.5	53.5	118.5	72.5	95	100
LL338	1	118	82	52			94	51	81	80
	2	118	82	52			93	52	81	80
	Avg	118	82	52	PMD	PMD	93.5	51.5	81	80
LL347	1								76	74
	2								77	73
	Avg	PMD	PMD	PMD	PMD	PMD	PMD	PMD	76.5	73.5
LL365	1	124	88	78	53	42	107	57	88	89
	2	124	87	78	52	41	107	57	88	89
	Avg	124	87.5	78	52.5	41.5	107	57	88	89
LL369	1				52	34		43	80	78
	2				52	34		43	80	78
	Avg	PMD	PMD	PMD	52	34	PMD	43	80	78
LL371	1				50	32		52	84	84
	2				51	33		53	84	84
	Avg	PMD	PMD	PMD	50.5	32.5	PMD	52.5	84	84
LL385	1				50	37		61	81	81
	2				50	38		60	81	82
	Avg	PMD	PMD	PMD	50	37.5	PMD	60.5	81	81.5

Specimen ID	#	ba-b	ba-n	ba-pr	ecm-ecm	pr-alv	AUB	n-pr	ft-ft	fmt-fmt
LL391	1	130	99	91	59	49	120	81	101	105
	2	130	98	91	59	49	120	81	101	106
	Avg	130	98.5	91	59	49	120	81	101	105.5
LL392	1				47	36		52	82	81
	2				46	36		51	81	81
	Avg	UNF	UNF	UNF	46.5	36	UNF	51.5	81.5	81
LL394	1	131	98	96	58	55	118	73	96	99
	2	130	97	98	58	54	119	72	96	99
	Avg	130.5	97.5	97	58	54.5	118.5	72.5	96	99
LL402	1				46	32			79	75
	2				47	32			78	75
	Avg	UNF	MISS	MISS	46.5	32	UNF	MISS	78.5	75
LL452	1	125	93	85	56	46	111	58	87	89
	2	125	92	85	55	45	111	59	87	89
	Avg	125	92.5	85	55.5	45.5	111	58.5	87	89
LL466	1				50	31		49	78	78
	2				50	30		50	78	77
	Avg	PMD	PMD	PMD	50	30.5	PMD	49.5	78	77.5
LL516	1	124	82	75	56	39	103	56	83	85
	2	124	81	76	55	38	103	56	84	85
	Avg	124	81.5	75.5	55.5	38.5	103	56	83.5	85
LL521	1	123			50	37		53	87	85
	2	123			51	37		53	86	86
	Avg	123	UNF	UNF	50.5	37	UNF	53	86.5	85.5
LL522	1				50	34		54	84	82
	2				49	34		54	84	82
	Avg	PMD	PMD	PMD	49.5	34	UNF	54	84	82
LL600	1				55	36		54	82	81
	2				54	36		53	81	81
	Avg	PMD	PMD	PMD	54.5	36	PMD	53.5	81.5	81
LL684	1	131	89	86	58	49	118	70	93	95
	2	132	90	85	58	49	118	70	93	96
	Avg	131.5	89.5	85.5	58	49	118	70	93	95.5
LL719	1	123	88		49		103		89	87
	2	123	88		50		104		89	87
	Avg	123	88	PMD	49.5	PMD	103.5	PMD	89	87
LL740	1				51	35		49	82	83
	2				51	36		49	82	83
	Avg	PMD	PMD	PMD	51	35.5	PMD	49	82	83

Specimen ID	#	n-ns	al-al	d-ec (L)	d-ec (R)	d-fmt (L)	d-fmt (R)	OBH (L)	OBH (R)
LL8	1	49	24	37	38	37	37	32	32
	2	50	24	37	38	37	37	32	32
	Avg	49.5	24	37	38	37	37	32	32
LL39	1	49	20	38	37	36	37	34	35
	2	49	21	37	38	37	37	35	36
	Avg	49	20.5	37.5	37.5	36.5	37	34.5	35.5
LL81	1		16	30	30	30	29	34	32
	2		16	31	30	30	29	35	32
	Avg	PMD	16	30.5	30	29	30	34.5	32
LL83	1	50	22	41	40	39	40	34	35
	2	50	22	41	41	39	40	35	35
	Avg	50	22	41	40.5	39	40	34.5	35
LL204	1	53	22	37	36	35	35	39	36
	2	53	22	38	37	35	35	38	36
	Avg	53	22	37.5	36.5	35	35	38.5	36
LL221	1				40	36	36		32
	2				40	36	36		32
	Avg	PMD	PMD	PMD	40	36	36	PMD	32
LL291	1	49	21	37	39	36	37	33	33
	2	48	21	38	40	37	37	33	33
	Avg	48.5	21	37.5	39.5	36.5	37	33	33
LL301	1	53	22	38	38	38	39	36	35
	2	53	21	38	38	38	39	35	36
	Avg	53	21.5	38	38	38	39	35.5	35.5
LL336	1	52	23	39	39	37	38	33	33
	2	53	23	39	39	37	38	33	33
	Avg	52.5	23	39	39	37	38	33	33
LL338	1	35		31		32		33	
	2	35		31		33		34	
	Avg	35	PMD	31	PMD		UNF	33.5	PMD
LL347	1					31	32		
	2					32	31		
	Avg	PMD	PMD	PMD	PMD	31.5	31.5	PMD	PMD
LL365	1	42	19	38	37	37	36	33	34
	2	42	19	38	38	37	36	33	34
	Avg	42	19	38	37.5	37	36	33	34
LL369	1	32	18	32	32	31	31	30	30
	2	32	18	31	32	31	31	29	30
	Avg	32	18	31.5	32	31	31	29.5	30
LL371	1	36	18	33	33	33	34	33	32
	2	36	18	33	33	32	33	33	33
	Avg	36	18	33	33	32.5	33.5	33	32.5
LL385	1	43	18	35	35	33	34	33	34
	2	42	19	34	35	33	34	33	34
	Avg	42.5	18.5	34.5	35	33	34	33	34

Specimen ID	#	n-ns	al-al	d-ec (L)	d-ec (R)	d-fmt (L)	d-fmt (R)	OBH (L)	OBH (R)
LL391	1	55	24	41	40	40	41	38	37
	2	55	24	40	40	41	41	38	37
	Avg	55	24	40.5	40	40.5	41	38	37
LL392	1	36	19	32	34	32	33	31	30
	2	36	19	32	33	32	33	31	30
	Avg	36	19	32	33.5	32	33	31	30
LL394	1	57	22	39	41	39	39	35	35
	2	58	22	40	42	39	40	35	34
	Avg	57.5	22	39.5	41.5	39	39.5	35	34.5
LL402	1					30	28		
	2					30	28		
	Avg	MISS	MISS	MISS	MISS	30	28	MISS	MISS
LL452	1	48	20	36	35	34	33	31	31
	2	48	20	35	36	34	33	31	31
	Avg	48	20	35.5	35.5	34	33	31	31
LL466	1	36	16		32	31	31	30	30
	2	35	16		32	30	31	29	29
	Avg	35.5	16	MISS	32	30.5	31	29.5	29.5
LL516	1	41	20	32	33	32	32	29	28
	2	41	20	33	33	32	32	28	28
	Avg	41	20	32.5	33	32	32	28.5	28
LL521	1	39	18	34		34	34	32	33
	2	39	18	34		34	34	32	33
	Avg	39	18	34	PMD	34	34	32	33
LL522	1	40	20	33	33	32	32	30	31
	2	41	21	33	33	32	32	30	31
	Avg	40.5	20.5	33	33	32	32	30	31
LL600	1	38	17	33		32	33	31	32
	2	37	16	33		33	32	32	33
	Avg	37.5	16.5	33	PMD	32.5	32.5	31.5	32.5
LL684	1	50	16	38	37	37	37	34	35
	2	50	16	37	37	37	37	35	35
	Avg	50	16	37.5	37	37	37	34.5	35
LL719	1	44	17	37	36	34	33	34	34
	2	44	17	37	36	34	33	34	34
	Avg	44	17	37	36	34	33	34	34
LL740	1	34	19	34	34	33	34	29	30
	2	34	19	34	34	34	34	30	30
	Avg	34	19	34	34	33.5	34	29.5	30

Specimen ID	#	ec-ec	d-d	n-b	b-l	l-o	ba-o	FOB	MDH (L)	MDH (R)
LL8	1	92	20	107	109	95	37	28	26	28
	2	91	20	108	109	95	37	28	26	28
	Avg	91.5	20	107.5	109	95	37	28	26	28
LL39	1	86	17	110	104	99	34	30	28	26
	2	85	18	110	104	99	34	31	27	26
	Avg	85.5	17.5	110	104	99	34	30.5	27.5	26
LL81	1	74	16		109					
	2	74	16		108					
	Avg	74	16	PMD	108.5	PMD	PMD	PMD	PMD	PMD
LL83	1	90	19	110	108	92	36	28		26
	2	91	19	110	107	93	36	29		26
	Avg	90.5	19	110	107.5	92.5	36	28.5	PMD	26
LL204	1	85	21	103	114	92	34	28		
	2	85	21	102	115	92	34	29		
	Avg	85	21	102.5	114.5	92		28.5	PMD	PMD
LL221	1		20	105	108	95	31	28		26
	2		19	104	107	95	31	28		27
	Avg	PMD	19.5	104.5	107.5	95	31	28	PMD	26.5
LL291	1	91	20	108	104	91	36	31	30	27
	2	91	20	108	104	91	37	30	30	26
	Avg	91	20	108	104	91	36.5	30.5	30	26.5
LL301	1	89	21	110	112	91	40	36	32	32
	2	89	21	110	111	91	40	36	32	31
	Avg	89	21	110	111.5	91	40	36	32	31.5
LL336	1	93	21	116	119	103	37	32	31	
	2	92	21	116	118	102	38	33	32	
	Avg	92.5	21	116	118.5	102.5	37.5	32.5	31.5	PMD
LL338	1		16	91	106	88	31	27	20	17
	2		16	92	105	89	30	27	19	17
	Avg	PMD	16	91.5	105.5	88.5	30.5	27	19.5	17
LL347	1		16	85						
	2		16	85						
	Avg	PMD	16	85	PMD	PMD	PMD	PMD	PMD	PMD
LL365	1	82	15	103	99	90	33	31	22	24
	2	83	15	103	100	89	33	31	21	24
	Avg	82.5	15	103	99.5	89.5	33	31	21.5	24
LL369	1	74	15	84	96					
	2	74	15	84	96					
	Avg	74	15	84	96	PMD	PMD	PMD	PMD	PMD
LL371	1	78	17	99						
	2	79	16	99						
	Avg	78.5	16.5	99	PMD	PMD	PMD	PMD	PMD	PMD
LL385	1	76	13				34	29	19	
	2	75	13				34	29	19	
	Avg	75.5	13	PMD	PMD	PMD	34	29	19	PMD

Specimen ID	#	ec-ec	d-d	n-b	b-l	l-o	ba-o	FOB	MDH (L)	MDH (R)
LL391	1	96	24	116	112	94	36	30	29	30
	2	96	24	115	112	93	37	31	30	30
	Avg	96	24	115.5	112	93.5	36.5	30.5	29.5	30
LL392	1	79	18	92	107	90		29	19	16
	2	79	18	91	107	90		29	19	17
	Avg	79	18	91.5	107	90	UNF	29	19	16.5
LL394	1	92	20	111	122	101	39	34	32	
	2	91	20	111	122	101	39	34	32	
	Avg	91.5	20	111	122	101	39	34	32	PMD
LL402	1		18	104	92	82			11	
	2		18	104	92	82			12	
	Avg	MISS	18	104	92	82	PMD	PMD	11.5	PMD
LL452	1	82	18	105	106	93	31	29	27	25
	2	83	18	105	106	93	31	28	27	24
	Avg	82.5	18	105	106	93	31	28.5	27	24.5
LL466	1		16	94	100	86		25	14	14
	2		16	93	100	87		26	13	15
	Avg	MISS	16	93.5	100	86.5	MISS	25.5	13.5	14.5
LL516	1	78	16	100	105	95	34	27	22	20
	2	79	16	100	104	95	34	27	21	20
	Avg	78.5	16	100	104.5	95	34	27	21.5	20
LL521	1		17	96	102	95	35	29	18	16
	2		17	97	102	94	34	29	19	15
	Avg	PMD	17	96.5	102	94.5	34.5	29	18.5	15.5
LL522	1	77	16	99	101				17	
	2	77	17	99	102				18	
	Avg	77	16.5	99	101.5	PMD	PMD	PMD	17.5	PMD
LL600	1		15	99	100	84				21
	2		15	99	101	85				20
	Avg	PMD	15	99	100.5	84.5	PMD	PMD	PMD	20.5
LL684	1	86	18	108	112	90	35	31	32	28
	2	86	18	108	112	90	35	31	32	29
	Avg	86	18	108	112	90		31		28.5
LL719	1	80	14	105	107	90	37	32	20	
	2	80	14	105	107	90	37	33	20	
	Avg	80	14	105	107	90	37	32.5	20	PMD
LL740	1	80	16	96	101					10
	2	79	16	96	101					11
	Avg	79.5	16	96	101	PMD	PMD	PMD	PMD	10.5

Specimen ID	#	ASB	ZMB	MOW	Circ	Sag Arc	Fro H Arc	Par H Arc	Occip H Arc	L Eye Circ
LL8	1	108	88	50	492	358	126	123	109	115
	2	108	88	50	491	358	126	123	109	115
	Avg	108	88	50	491.5	358	126	123	109	115
LL39	1	105	78	43	476	358	125	114	119	112
	2	105	77	44	476	358	125	114	119	113
	Avg	105	77.5	43.5	476	358	125	114	119	112.5
LL81	1		62	33				127		
	2		62	32				127		
	Avg	PMD	62	32.5	PMD	PMD	PMD	127	PMD	PMD
LL83	1	105	85	44	495	360	125	121	114	120
	2	105	86	44	494	360	125	121	114	121
	Avg	105	85.5	44	494.5	360	125	121	114	120.5
LL204	1	102	79	47	484	351	119	127	105	115
	2	103	80	47	484	351	119	127	105	115
	Avg	102.5	79.5	47	484	351	119	127	105	115
LL221	1	102			480	348	117	118	114	
	2	102			481	348	117	118	114	
	Avg	102	PMD	PMD	480.5	348	117	118	114	PMD
LL291	1	108	80	51	490	344	124	114	103	120
	2	107	79	51	489	344	124	114	103	121
	Avg	107.5	79.5	51	489.5	344	124	114	103	120.5
LL301	1	110	83	46	487	355	124	127	104	125
	2	110	82	46	486	355	124	127	104	125
	Avg	110	82.5	46	486.5	355	124	127	104	125
LL336	1	112	86	47	525	395	136	130	129	120
	2	112	86	48	524	395	136	130	129	120
	Avg	112	86	47.5	524.5	395	136	130	129	120
LL338	1	94			440	336	110	120	106	109
	2	95			441	336	110	120	106	110
	Avg	94.5	PMD	PMD	440.5	336	110	120	106	109.5
LL347	1						102	109		
	2						102	109		
	Avg	PMD	PMD	PMD	PMD	PMD	102	109	PMD	PMD
LL365	1	101	74	38	473	339	121	114	104	113
	2	102	74	38	472	339	121	114	104	114
	Avg	101.5	74	38	472.5	339	121	114	104	113.5
LL369	1		68	43			98	105		100
	2		69	43			98	105		101
	Avg	PMD	68.5	43	PMD	PMD	98	105	PMD	100.5
LL371	1		68	39			115			107
	2		68	40			114			107
	Avg	PMD	68	39.5	PMD	PMD	114.5	PMD	PMD	107
LL385	1	104	68	40						110
	2	104	68	40						109
	Avg	PMD	68	40	PMD	PMD	PMD	PMD	PMD	109.5

Specimen ID	#	ASB	ZMB	MOW	Circ	Sag Arc	Fro H Arc	Par H Arc	Occip H Arc	L Eye Circ
LL391	1	110	84	51	523	386	138	128	120	130
	2	110	84	51	524	386	138	128	120	130
	Avg	110	84	51	523.5	386	138	128	120	130
LL392	1		64	40		341	108	119	111	103
	2		64	40		341	109	120	111	102
	Avg	UNF	64	40	UNF	341	108.5	119.5	111	102.5
LL394	1	116	78	46	530	389	127	138	123	120
	2	115	77	45	531	388	127	138	122	119
	Avg	115.5	77.5	45.5	530.5		127			119.5
LL402	1					331	129	105	97	
	2					331	129	105	97	
	Avg	UNF	MISS	MISS	UNF	331	129	105	97	MISS
LL452	1	103	77	41	473	344	121	116	107	106
	2	103	76	41	473	344	121	116	107	105
	Avg	103	76.5	41	473	344	121	116	107	105.5
LL466	1	98	69	39	460	331	116	112	103	
	2	98	68	39	459	330	116	112	102	
	Avg	98	68.5	39	459.5	330.5	116	112	102.5	MISS
LL516	1	99	78	43	465	345	116	118	111	98
	2	99	78	43	466	346	116	118	111	98
	Avg	99	78	43	465.5	345.5	116	118	111	98
LL521	1	107	69	40		343	116	115	112	110
	2	107	69	39		343	116	115	112	111
	Avg	107	69	39.5	UNF	343	116	115	112	110.5
LL522	1		71	36			117	116		102
	2		72	35			116	115		101
	Avg	PMD	71.5	35.5	PMD	PMD	116.5	115.5	PMD	101.5
LL600	1		73	50		340	119	119	102	97
	2		73	50		340	119	119	102	96
	Avg	PMD	73	50	PMD	340	119	119	102	96.5
LL684	1	106	81	35	476	359	122	131	106	116
	2	105	82	35	476	359	122	131	106	115
	Avg	105.5	81.5	35	476	359	122	131	106	115.5
LL719	1	102	72	41	482	353	126	120	105	110
	2	102	72	41	481	353	126	120	105	109
	Avg	102	72	41	481.5	353	126	120	105	109.5
LL740	1		70	40			112	116		96
	2		69	40			113	117		96
	Avg	PMD	69.5	40	PMD	PMD	112.5	116.5	PMD	96

Specimen ID	#	R Eye Circ	Occip Arc	m-ParHArc (L)	m-ParHArc (R)	m-ParHCho (L)	m-ParHCho (R)	Par B Arc (L)
LL8	1	115	126	119	116	101	102	130
	2	116	127	118	117	100	102	129
	Avg	115.5	126.5	118.5	116.5	100.5	107.5	129.5
LL39	1	116	130	114	119	99	98	126
	2	115	130	113	118	98	98	125
	Avg	115.5	130	113.5	118.5	98.5	98	125.5
LL81	1							
	2							
	Avg	PMD	PMD	PMD	PMD	PMD	PMD	PMD
LL83	1	118	131	116	113	100	100	126
	2	119	130	116	114	99	100	126
	Avg	118.5	130.5	116	113.5	99.5	100	126
LL204	1	111	126	117	115	100	97	130
	2	110	126	116	114	101	96	129
	Avg	110.5	126	116.5	114.5	100.5	96.5	129.5
LL221	1	117	127	110	116	96	99	126
	2	116	128	111	116	95	99	126
	Avg	116.5	127.5	110.5	116	95.5	99	126
LL291	1	122	122	115	125	101	107	122
	2	121	121	114	125	100	108	122
	Avg	121.5	121.5	114.5	125	100.5	107.5	122
LL301	1	120	132	107	115	95	100	124
	2	121	132	106	115	94	99	123
	Avg	120.5	132	106.5	115	94.5	99.5	123.5
LL336	1	116	140	113	113	99	100	135
	2	117	139	113	113	99	101	134
	Avg	116.5	139.5	113	113	99	100.5	134.5
LL338	1		126	120	119	98	101	106
	2		127	119	120	99	100	107
	Avg	PMD	126.5	119.5	119.5	98.5	100.5	106.5
LL347	1			119	115	99	93	116
	2			119	115	99	93	115
	Avg	PMD	PMD	119	115	99	93	115.5
LL365	1	110	115	125	124	98	103	134
	2	111	115	124	125	99	103	134
	Avg	110.5	115	124.5	124.5	98.5	103	134
LL369	1	103		116	114	92	97	117
	2	102		115	115	92	96	116
	Avg	102.5	PMD	115.5	114.5	92	96.5	116.5
LL371	1	112		124			99	
	2	111		124			99	
	Avg	111.5	PMD	124	PMD	PMD	99	PMD
LL385	1	109	122					
	2	109	123					
	Avg	109	122.5	PMD	PMD	PMD	PMD	PMD

Specimen ID	#	R Eye Circ	Occip Arc	m-ParHArc (L)	m-ParHArc (R)	m-ParHCho (L)	m-ParHCho (R)	Par B Arc (L)
LL391	1	130	133	110	120	95	101	129
	2	129	134	109	119	95	101	130
	Avg	129.5	133.5	109.5	119.5	95	101	129.5
LL392	1	105	113	119	123	97	100	128
	2	104	114	119	123	96	101	127
	Avg	104.5	113.5	119	123	96.5	100.5	127.5
LL394	1	118	133	118	114	100	97	140
	2	119	134	117	114	101	98	139
	Avg	118.5	133.5	117.5	114	100.5	97.5	139.5
LL402	1			108		93		114
	2			109		92		114
	Avg	MISS	PMD	108.5	PMD	92.5	PMD	114
LL452	1	108	121	114	115	98	96	121
	2	107	121	115	114	99	96	121
	Avg	107.5	121	114.5	114.5	98.5	96	121
LL466	1	95	112	120	122	99	102	124
	2	96	112	121	121	100	101	123
	Avg	95.5	112	120.5	121.5	99.5	101.5	123.5
LL516	1	98	117	124	132	104	107	133
	2	98	116	125	132	103	107	132
	Avg	98	116.5	124.5	132	103.5	107	132.5
LL521	1		129	121	117	102	99	124
	2		130	121	118	103	99	125
	Avg	UNF	129.5	121	117.5	102.5	99	124.5
LL522	1	101		117	116	99	99	117
	2	102		116	116	98	99	116
	Avg	101.5	PMD	116.5	116	98.5	99	116.5
LL600	1				118		97	
	2				119		97	
	Avg	PMD	PMD	PMD	118.5	PMD	97	PMD
LL684	1	114	127	118	124	102	107	128
	2	115	128	117	125	102	108	129
	Avg	114.5	127.5	117.5	124.5	102	107.5	128.5
LL719	1	107	123	125	126	102	104	127
	2	107	123	124	127	101	104	128
	Avg	107	123	124.5	126.5	101.5	104	127.5
LL740	1	99			119		100	118
	2	100			119		100	119
	Avg	99.5	PMD	PMD	119	PMD	100	118.5

Specimen ID	#	Par B Arc (R)	Par B Cho (L)	Par B Cho (R)	Fro B Cho
LL8	1	130	113	113	103
	2	129	113	114	103
	Avg	129.5	113	113.5	103
LL39	1	127	111	114	93
	2	127	110	113	93
	Avg	127	110.5	113.5	93
LL81	1	130	106		93
	2	129	106		93
	Avg	129.5	106	PMD	93
LL83	1	126	111	109	105
	2	127	110	109	104
	Avg	126.5	110.5	109	104.5
LL204	1	129	115	112	110
	2	130	115	112	110
	Avg	129.5	115	112	110
LL221	1	126	109	111	102
	2	125	111	110	102
	Avg	125.5	110	110.5	102
LL291	1	122	108	104	
	2	121	109	105	
	Avg	121.5	108.5	104.5	PMD
LL301	1	130	109	111	103
	2	130	108	110	103
	Avg	130	108.5	110.5	103
LL336	1	131	120	114	112
	2	130	121	115	111
	Avg	130.5	120.5	114.5	111.5
LL338	1	112	95	100	89
	2	113	96	99	88
	Avg	112.5	95.5	99.5	88.5
LL347	1	110	100	99	83
	2	110	100	100	83
	Avg	110	100	99.5	83
LL365	1	126	114	108	97
	2	126	114	109	96
	Avg	126	114	108.5	96.5
LL369	1		103		73
	2		102		74
	Avg	PMD	102.5	PMD	73.5
LL371	1				92
	2				93
	Avg	PMD	PMD	PMD	92.5
LL385	1				97
	2				96
	Avg	PMD	PMD	PMD	96.5

Specimen ID	#	Par B Arc (R)	Par B Cho (L)	Par B Cho (R)	Fro B Cho
LL391	1	127	119	116	113
	2	128	118	115	112
	Avg	127.5	118.5	115.5	112.5
LL392	1	125	108	108	83
	2	124	109	107	84
	Avg	124.5	108.5	107.5	83.5
LL394	1	143	120	125	105
	2	144	121	125	106
	Avg	143.5	120.5	125	105.5
LL402	1		95		87
	2		96		86
	Avg	PMD	95.5	PMD	86.5
LL452	1	120	106	107	102
	2	120	107	107	102
	Avg	120	106.5	107	102
LL466	1	124	105	102	83
	2	123	106	101	82
	Avg	123.5	105.5	101.5	82.5
LL516	1	131	112	108	95
	2	132	112	109	96
	Avg	131.5	112	108.5	95.5
LL521	1	128	111	111	95
	2	127	111	110	95
	Avg	127.5	111	110.5	95
LL522	1	117	101	103	96
	2	117	102	104	95
	Avg	117	101.5	103.5	95.5
LL600	1	125		108	88
	2	124		107	89
	Avg	124.5	PMD	107.5	88.5
LL684	1	126	110	109	104
	2	125	110	109	104
	Avg	125.5	110	109	104
LL719	1	125	108	107	102
	2	124	109	108	102
	Avg	124.5	108.5	107.5	102
LL740	1	123	105	106	94
	2	122	106	107	93
	Avg	122.5	105.5	106.5	93.5

MISS = Missing

Hamann-Todd Human Osteological Collection

UNF= Unfused

Cleveland Museum of Natural History, Ohio

PMD = Post Mortem Damage

Red Fill = Accuracy of Measurement in Question

Specimen ID	Sex	Age (years)	Ancestry	Year Died	Cause of Death	#	g-op	eu-eu	zy-zy
HTH 0017	M	19	B	Unknown	Unknown	1	172	135	128
						2	171	135	128
						AVG	171.5	135	128
HTH 0098	M	18	W	1912	Gunshot	1	178		132
						2	179		133
						AVG	178.5	PMD	132.5
HTH 0233	M	19	W	1914	Drowning	1	182	151	135
						2	182	151	135
						AVG	182	151	135
HTH 0404	M	11	B	1916	TB Meningitis and pneumonia	1	183	129	113
						2	183	129	112
						AVG	183	129	112.5
HTH 0485	F	16	B	1917	Sepsis	1	172	134	122
						2	173	133	123
						AVG	172.5	133.5	122.5
HTH 0526	F	11	B	1917	Measles and pneumonia	1	168		
						2	168		
						AVG	168	PMD	PMD
HTH 0527	F	16	W	1917	Epilepsy	1	169	121	115
						2	170	120	116
						AVG	169.5	120.5	115.5
HTH 0576	F	16	B	1918	Pulmonary TB	1	182	133	125
						2	181	133	125
						AVG	181.5	133	125
HTH 0624	F	6	B	1918	Influenza	1			
						2			
						AVG	PMD	PMD	PMD
HTH 0632	F	10	B	1918	Influenza	1			
						2			
						AVG	PMD	PMD	PMD
HTH 0633	F	14	B	1918	Pneumonia	1	184		
						2	183		
						AVG	183.5	PMD	PMD
HTH 0645	F	12	W	1918	Influenza	1	167	143	112
						2	166	143	111
						AVG	166.5	143	111.5
HTH 0695	M	18	B	1919	Influenza	1	188	142	134
						2	187	142	134
						AVG	187.5	142	134
HTH 0710	M	10	B	1919	Acute nephritis	1	PMD	PMD	PMD
						2			
						AVG	PMD	PMD	PMD

Specimen ID	#	ba-b	ba-n	ba-pr	ecm-ecm	pr-alv	AUB	n-pr	ft-ft	fmt-fmt
HTH 0017	1	122	89	95.54	64.6	52.54	120.31	68.78	92.63	105.88
	2	122	90	95.64	64.48	52.94	120.77	69.03	92.18	106
	AVG	122	89.5	95.59	64.54	52.74	120.54	68.905	92.405	105.94
HTH 0098	1				65.36	52.31	126.82	69.78	96.16	101.18
	2				64.87	52.83	126.19	69.95	96.02	100.7
	AVG	PMD	PMD	PMD	65.115	52.57	126.505	69.865	96.09	100.94
HTH 0233	1	133	102	99	68.72	51.73	128.27	64.54	102.72	113.01
	2	133	103	98	68.57	52.18	128.19	66.6	102.59	113.1
	AVG	133	102.5	98.5	68.645	51.955	128.23	65.57	102.655	113.055
HTH 0404	1		92	92.71	61.28	50.08	111.02	63.78	88.37	94.67
	2		91	92.86	61.67	49.46	110.9	63.56	88.67	94.62
	AVG	PMD	91.5	92.785	61.475	49.77	110.96	63.67	88.52	94.645
HTH 0485	1	126	90	90.33	69.09	51.25	119.85	66.87	91.83	98.68
	2	125	91	89.59	68.35	50.23	120	67.19	92.17	98.15
	AVG	125.5	90.5	89.96	68.72	50.74	119.925	67.03	92	98.415
HTH 0526	1	121	90	91.07		43.19	PMD	62.23		
	2	121	89	90.75		43.18		62.05		
	AVG	121	89.5	90.91	PMD	43.185	PMD	62.14	PMD	PMD
HTH 0527	1	127	98	93.17	57.57	50.64	106.48	61.42	84.29	91.78
	2	122	97	93.25	58.31	51.04	106.47	62.14	83.97	91.44
	AVG	124.5	97.5	93.21	57.94	50.84	106.475	61.78	84.13	91.61
HTH 0576	1	121	96			53.08	120.19	PMD	92.67	102.1
	2	121	96			54.04	120.22		91.68	102.39
	AVG	121	96	PMD	PMD	53.56	120.205	PMD	92.175	102.245
HTH 0624	1									
	2									
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD
HTH 0632	1									
	2									
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD
HTH 0633	1	131	97	93.51		45.15		58.46		
	2	130	96	93.66		44.2		58.54		
	AVG	130.5	96.5	93.585	PMD	44.675	PMD	58.5	PMD	PMD
HTH 0645	1	122	89	58.17	49.18	39.63	112.54	58.84	89.93	90.41
	2	123	89	79.91	49.27	40.69	112.87	57.77	90.15	90.23
	AVG	122.5	89	69.04	49.225	40.16	112.705	58.305	90.04	90.32
HTH 0695	1	133	101	103	72.06	55.79	120.96	76.8	100.31	108.61
	2	133	101	103	72.1	56.47	120.97	76.37	100.23	108.87
	AVG	133	101	103	72.08	56.13	120.965	76.585	100.27	108.74
HTH 0710	1	PMD	PMD	PMD	62.15	49.92	PMD	69.33	88.59	92.38
	2				62.53	49.75		69.5	88.09	92.54
	AVG	PMD	PMD	PMD	62.34	49.835	PMD	69.415	88.34	92.46

Specimen ID	#	n-ns	al-al	d-ec (L)	d-ec (R)	d-fmt (L)	d-fmt (R)	OBH (L)	OBH (R)	ec-ec
HTH 0017	1	51.07	26	40.6	41.4	41.61	40.61	36.21	35.19	98.43
	2	51.93	25.77	40.89	40.99	41.25	40.65	36.2	35.49	97.7
	AVG	51.5	25.885	40.745	41.195	41.43	40.63	36.205	35.34	98.065
HTH 0098	1	54.12	22.85	38.47	39.79	37.02	37.69	35.33	34.96	97.93
	2	54.02	22.94	38.44	39.65	37.36	37.54	35.31	35.07	98.7
	AVG	54.07	22.895	38.455	39.72	37.19	37.615	35.32	35.015	98.315
HTH 0233	1	48.59	20.92	45.12	46.71	44.69	45.91	35.56	34.23	105.71
	2	49.42	21.71	44.23	46.8	43.93	46.1	36.65	34	104.87
	AVG	49.005	21.315	44.675	46.755	44.31	46.005	36.105	34.115	105.29
HTH 0404	1	45.9	22.94	35.06	36.13	35.83	36.51	34.82	34.82	89
	2	45	22.99	35.44	35.79	35.84	36.07	34.63	34.69	89.47
	AVG	45.45	22.965	35.25	35.96	35.835	36.29	34.725	34.755	89.235
HTH 0485	1	48.84	24.68	40.4	40.02	40.15	40.44	37.44	36.72	93.16
	2	50.63	24.98	45.54	40.76	39.84	39.73	37.09	36.37	92.76
	AVG	49.735	24.83	42.97	40.39	39.995	40.085	37.265	36.545	92.96
HTH 0526	1	45.02			36.58		36.63		35.37	
	2	45.67			36.91		36.52		35.99	
	AVG	45.345	PMD	PMD	36.745	PMD	36.575	PMD	35.68	PMD
HTH 0527	1	45.34	24.38	36.09	36.95	34.82	35.8	30.24	30.24	87.85
	2	46	24.2	35.52	37.12	33.43	35.76	30.82	30.24	87.75
	AVG	45.67	24.29	35.805	37.035	34.125	35.78	30.53	30.24	87.8
HTH 0576	1	49.97		40.24	39.71	38.52	38.99	37.65	37.03	97.63
	2	50.06		39.84	38.73	40.21	39.51	37.64	37.08	96.79
	AVG	50.015	PMD	40.04	39.22	39.365	39.25	37.645	37.055	97.21
HTH 0624	1	38.4			34.7		34.24		33.81	
	2	38.35			35.21		34.64		33.79	
	AVG	38.375	PMD	PMD	34.955	PMD	34.44	PMD	33.8	PMD
HTH 0632	1				35.41	35.88	34.8		31.76	
	2				35.51	36.76	35.02		31.85	
	AVG	PMD	PMD	PMD	35.46	36.32	34.91	PMD	31.805	PMD
HTH 0633	1	45.99			37.57		38.26		36.26	
	2	46.46			37.62		38.33		36.24	
	AVG	46.225	PMD	PMD	37.595	PMD	38.295	PMD	36.25	PMD
HTH 0645	1	46.72	18.48	36.29	36.03	34.54	34.43	34.19	35.61	85.27
	2	46.77	18.55	35.86	36.21	34.73	34.45	34.15	34.8	85.96
	AVG	46.745	18.515	36.075	36.12	34.635	34.44	34.17	35.205	85.615
HTH 0695	1	54.34	25.72	42.78	43.7	42.33	42.1	38.79	38.22	104.64
	2	54.77	25.55	42.41	44.42	42.61	42.62	39.72	38.58	104.23
	AVG	54.555	25.635	42.595	44.06	42.47	42.36	39.255	38.4	104.435
HTH 0710	1	49.42	21.74	36.73	35.92	36.12	35.19	32.6	32.74	87.07
	2	49.13	21.7	35.99	35.75	35.92	34.85	32.45	31.76	87.71
	AVG	49.275	21.72	36.36	35.835	36.02	35.02	32.525	32.25	87.39

Specimen ID	#	d-d	n-b	b-l	l-o	ba-o	FOB	MDH (L)	MDH (R)	ASB	ZMB
HTH 0017	1	21.33	101.68	112.07	84.59	33.97	29.45	29.08	29.35	108.23	88.06
	2	21.35	101.62	112.29	84.61	33.96	29.01	29.27	29.07	108.76	88.29
	AVG	21.34	101.65	112.18	84.6	33.965	29.23	29.175	29.21	108.495	88.175
HTH 0098	1	24.06				37.29	31.83			110.01	95.03
	2	24.06				37.02	31.36			109.73	95.46
	AVG	24.06	PMD	PMD	PMD	37.155	31.595	PMD	PMD	109.87	95.245
HTH 0233	1	21.14	110.21	114.63	96.39	36.99	29.69	25.46	27.54	116.96	89.56
	2	21.75	110.66	114.04	95.6	36.72	28.85	25.5	26.5	116.57	90.85
	AVG	21.445	110.435	114.335	95.995	36.855	29.27	25.48	27.02	116.765	90.205
HTH 0404	1	18.14		114.41	96.51	36.99	30.9	23.8	24.22	104.04	77.74
	2	17.95		114.85	96.72	36.86	30.87	24.15	24.56	103.11	77.86
	AVG	18.045	PMD	114.63	96.615	36.925	30.885	23.975	24.39	103.575	77.8
HTH 0485	1	22.09	104.32	110.17	101.22	29.82	29.02	25.34	27.13	108.75	90.07
	2	21.23	104.36	109.61	101.67	29.72	28.59	25.83	27.61	108.99	89.69
	AVG	21.66	104.34	109.89	101.445	29.77	28.805	25.585	27.37	108.87	89.88
HTH 0526	1		98.5	107.63	88.6	34.31			27.89		
	2		97.94	107.78	87.48	33.45			27.96		
	AVG	PMD	98.22	107.705	88.04	33.88	PMD	PMD	27.925	PMD	PMD
HTH 0527	1	21.3	102.71	105.11	84.19	38.22	26.52	22.24	23.56		80.67
	2	21.73	103.1	105.07	84.39	38.32	26.65	23.69	23.42		80.63
	AVG	21.515	102.905	105.09	84.29	38.27	26.585	22.965	23.49	PMD	80.65
HTH 0576	1	23.82	105.88	103.45	95.52	36.08	25.04	27.26	26.85	98.97	
	2	23.23	106.37	104.16	95.56	36.09	25.19	27.79	26.81	97.65	
	AVG	23.525	106.125	103.805	95.54	36.085	25.115	27.525	26.83	98.31	PMD
HTH 0624	1		96.38	106.55	92.37	35.75	27.79				
	2		96.98	106.39	92.46	35.36	27.08				
	AVG	PMD	96.68	106.47	92.415	35.555	27.435	PMD	PMD	PMD	PMD
HTH 0632	1		97.3	105.19	86.4	31.7	25.72	16.41	20.61		
	2		97.08	105.43	86.13	31.84	25.7	15.17	20.18		
	AVG	PMD	97.19	105.31	86.265	31.77	25.71	15.79	20.395	PMD	PMD
HTH 0633	1		105.87	126.16	93.49	33.24			27.87		
	2		106.07	126.95	93.06	33.25			27.96		
	AVG	PMD	105.97	126.555	93.275	33.245	PMD	PMD	27.915	PMD	PMD
HTH 0645	1	16.51	98.82	101.58	92.23	33.5	31.7	22.77	23.97	117.25	73.38
	2	16.55	98.77	101.85	92.33	33.51	32.35	21.68	22.65	116.69	72.44
	AVG	16.53	98.795	101.715	92.28	33.505	32.025	22.225	23.31	116.97	72.91
HTH 0695	1	24.13	118.08	119.74	92.99	36.37	26.33	28.06	30.95		96.91
	2	23.68	118.41	119.81	93.2	36.36	26.81	28.16	31.08		96.61
	AVG	23.905	118.245	119.775	93.095	36.365	26.57	28.11	31.015	PMD	96.76
HTH 0710	1	18.74			95.64	36.42	26.32	22.99	23.08		77.02
	2	18.68			95.66	36.45	26.81	22.32	23.01		77.39
	AVG	18.71	PMD	PMD	95.65	36.435	26.565	22.655	23.045	0	77.205

Specimen ID	#	MOW	Circ	Sag Arc	Fro H Arc	Par H Arc	Occip H Arc	L Eye Circ	R Eye Circ	Occip Arc	mid-ParHArc (L)
HTH 0017	1		493			124	107	126	126	124	112
	2		493			125	107	125	126	125	113
	AVG	PMD	493	PMD	PMD	124.5	107	125.5	126	124.5	112.5
HTH 0098	1	56.84						116	118	128	
	2	57.2						117	117	129	
	AVG	57.02	PMD	PMD	PMD	PMD	PMD	116.5	117.5	128.5	PMD
HTH 0233	1		528			133		130	129	130	123
	2		527			132		130	129	130	
	AVG	PMD	527.5	PMD	PMD	132.5	PMD	130	129	130	123
HTH 0404	1	46.29	504		132	126	114	116	111	127	120
	2	46.47	503		133	125	115	114	112	127	120
	AVG	46.38	503.5	PMD	132.5	125.5	114.5	115	111.5	127	120
HTH 0485	1	60.36	495	367	121	123	123	119	119	126	121
	2	60.11	496	366	121	122	123	118	118	125	120
	AVG	60.235	495.5	366.5	121	122.5	123	118.5	118.5	125.5	120.5
HTH 0526	1			340	113	120	107		115		
	2			340	113	120	107		114		
	AVG	PMD	PMD	340	113	120	107	PMD	114.5	PMD	PMD
HTH 0527	1	54.84	461	331	115	116	100	105	107		113
	2	54.78	461	331	115	116	100	105	106		112
	AVG	54.81	461	331	115	116	100	105	106.5	PMD	112.5
HTH 0576	1		497				122	131		114	116
	2		496				122	131		113	116
	AVG	PMD	496.5	PMD	PMD	PMD	122	131	PMD	113.5	116
HTH 0624	1				114	114	111		108		115
	2				114	115	112		109		115
	AVG	PMD	PMD	PMD	114	114.5	111.5	PMD	108.5	PMD	115
HTH 0632	1				118	118	102		109		125
	2				119	117	102		108		126
	AVG	PMD	PMD	PMD	118.5	117.5	102	PMD	108.5	0	125.5
HTH 0633	1			383	125	142	116		116		
	2			383	125	142	116		116		
	AVG	PMD	PMD	383	125	142	116	PMD	116	PMD	PMD
HTH 0645	1	46.61	492	340	113	112	115	109	108	137	113
	2	45.94	492	341	114	112	115	108	109	137	113
	AVG	46.275	492	340.5	113.5	112	115	108.5	108.5	137	113
HTH 0695	1	69.03	526			133		132	134		130
	2	68.29	526			133		132	134		131
	AVG	68.66	526	PMD	PMD	133	PMD	132	134	PMD	130.5
HTH 0710	1	51.63					114	108	108	129	
	2	51.24					115	109	109	129	
	AVG	51.435	PMD	PMD	PMD	PMD	114.5	108.5	108.5	129	PMD

Specimen ID	#	mid-ParHArc (R)	mid-ParHCho (L)	mid-ParHCho (R)	Par B Arc (L)	Par B Arc (R)	Par B Cho (L)	Par B Cho (R)	Fro B Cho
HTH 0017	1	115	97.5	92.96	138	133	120.05	117	106
	2	116	97.85	93.2	139	134	120.96	117.5	105
	AVG	115.5	97.675	93.08	138.5	133.5	120.505	117.25	105.5
HTH 0098	1								109
	2								110
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	109.5
HTH 0233	1	122	108.77	106.49	137	140	122.11	122.38	113
	2								
	AVG	122	108.77	106.49	137	140	122.11	122.38	113
HTH 0404	1	121	103.32	98.55					102
	2	121	103.27	98.9					102
	AVG	121	103.295	98.725	PMD	PMD	PMD	PMD	102
HTH 0485	1	122	102.29	101.42	127	130	113.2	111.33	107
	2	122	102.24	102.7	126	129	113.04	110.26	107
	AVG	122	102.265	102.06	126.5	129.5	113.12	110.795	107
HTH 0526	1	115		98.16		128		107.93	
	2	116		99.15		127		108.62	
	AVG	115.5	PMD	98.655	PMD	127.5	PMD	108.275	PMD
HTH 0527	1	108	95.03	92.04	119	122	107.75	104.91	96
	2	109	95.93	91.51	120	123	106.45	103.55	97
	AVG	108.5	95.48	91.775	119.5	122.5	107.1	104.23	96.5
HTH 0576	1	112	100.25	95.08	125	126	113.72	114.11	103
	2	113	100.14	95.52	125	125	114.28	114.34	102
	AVG	112.5	100.195	95.3	125	125.5	114	114.225	102.5
HTH 0624	1	117	92.35	97.06	124	124	110.36	102.4	
	2	118	92.36	97.7	125	124	110.75	102.63	
	AVG	117.5	92.355	97.38	124.5	124	110.555	102.515	PMD
HTH 0632	1	127	102.06	104.45	127	126	108.08	107.79	
	2	127	102.5	103.6	128	127	108.48	107.31	
	AVG	127	102.28	104.025	127.5	126.5	108.28	107.55	PMD
HTH 0633	1	130		108.53		142		116.19	
	2	131		107.66		141		116.3	
	AVG	130.5	PMD	108.095	PMD	141.5	PMD	116.245	PMD
HTH 0645	1		96.25		128	126	112.34	104.54	87
	2		95.9		128	125	113.8	105.68	86
	AVG	PMD	96.075	PMD	128	125.5	113.07	105.11	86.5
HTH 0695	1	121	111.92	105.54	145	143	127.25	122.26	110
	2	121	111.4	105.75	146	143	127.4	122.58	111
	AVG	121	111.66	105.645	145.5	143	127.325	122.42	110.5
HTH 0710	1								
	2								
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD

Specimen ID	Sex	Age (years)	Ancestry	Year Died	Cause of Death	#	g-op	eu-eu	zy-zy
HTH 0721	M	18	B	1919	TB	1	186	145	134
						2	185	144	134
						AVG	185.5	144.5	134
HTH 0872	F	8	B	1921	TB meningitis	1	166	128	109
						2	167	127	109
						AVG	166.5	127.5	109
HTH 1012	F	18	B	1923	Pulmonary TB	1	170	129	123
						2	169	129	122
						AVG	169.5	129	122.5
HTH 1041	F	17	B	1923	Pulmonary TB	1	167	131	118
						2	167	130	118
						AVG	167	130.5	118
HTH 1074	F	4	B	1923	Pertussis	1	170	139	104
						2	169	139	105
						AVG	169.5	139	104.5
HTH 1097	M	18	B	1924	Tetanus	1	187	143	124
						2	188	142	125
						AVG	187.5	142.5	124.5
HTH 1098	F	5	B	1924	Accidental burns	1	150	119	
						2	149	120	
						AVG	149.5	119.5	PMD
HTH 1115	F	5	B	1924	Bronchial pneumonia	1		121	97
						2		122	97
						AVG	MISS	121.5	97
HTH 1156	F	8	B	1924	TB Peritonitis	1	161	133	107
						2	161	133	107
						AVG	161	133	107
HTH 1168	M	1	B	1924	Bronchopneumonia	1			
						2			
						AVG	PMD	PMD	PMD
HTH 1228	F	20	W	1925	Pulmonary TB	1	180	140	136
						2	180	140	136
						AVG	180	140	136
HTH 1232	F	16	B	1925	Pulmonary TB	1	180	131	125
						2	179	131	126
						AVG	179.5	131	125.5
HTH 1240	F	12	W	1925	Pulmonary TB	1	171		
						2	170		
						AVG	170.5	PMD	PMD
HTH 1385	M	1	B	1926	Pulmonary TB	1	145		
						2	145		
						AVG	145	PMD	PMD
HTH 1435	F	2	B	1926	Bronchial pneumonia	1			86
						2			86
						AVG	PMD	PMD	86

Specimen ID	#	ba-b	ba-n	ba-pr	ecm-ecm	pr-alv	AUB	n-pr	ft-ft	fmt-fmt
HTH 0721	1	138	104	102		55.85	121.45	69.12		
	2	138	105	102		56.39	121.47	69.87		
	AVG	138	104.5	102	PMD	56.12	121.46	69.495	PMD	PMD
HTH 0872	1	123	87	79	55.99	42.55	107.28	59.69	86.07	92.5
	2	123	88	79	56.33	41.07	106.58	59.88	86.18	92.49
	AVG	123	87.5	79	56.16	41.81	106.93	59.785	86.125	92.495
HTH 1012	1	121	92	102		52.91	112.04	61.29		
	2	122	93	102		53.75	111.8	62.03		
	AVG	121.5	92.5	102	PMD	53.33	111.92	61.66	PMD	PMD
HTH 1041	1	124	94	93.76	58.09	51.13	117.09	66.34	86.68	95.55
	2	124	95	93.52	58.75	50.98	116.9	65.73	86.65	94.76
	AVG	124	94.5	93.64	58.42	51.055	116.995	66.035	86.665	95.155
HTH 1074	1	120.66	81.68	78.49	56.2	37.77	104.22	46.07	95.72	95.19
	2	121	81.13	78.1	56.39	38.25	103.51	45.87	95.78	95.59
	AVG	120.83	81.405	78.295	56.295	38.01	103.865	45.97	95.75	95.39
HTH 1097	1	138	106	108	67.63	59.75	114.42	66.74		111.3
	2	138	106	107	68.47	60.41	113.64	66.22		111.57
	AVG	138	106	107.5	68.05	60.08	114.03	66.48	PMD	111.435
HTH 1098	1	112	80.82	75.01	52.06	37.91	96.48	46.55	85.9	88.72
	2	113	80.02	77.02	52.56	38.2	97.1	45.36	85.92	88.16
	AVG	112.5	80.42	76.015	52.31	38.055	96.79	45.955	85.91	88.44
HTH 1115	1				55		96.59		83	85
	2				55.55		96.44		83.15	85.11
	AVG	MISS	MISS	MISS	55.275	PMD	96.515	PMD	83.075	85.055
HTH 1156	1				55.07	42.52	103.1	52.83	89.55	92.19
	2				54.79	41.69	103.24	52.68	89.65	91.8
	AVG	PMD	PMD	PMD	54.93	42.105	103.17	52.755	89.6	91.995
HTH 1168	1				37.32				80.55	76.8
	2				37.43				81.58	77.15
	AVG	PMD	PMD	PMD	37.375	PMD	PMD	PMD	81.065	76.975
HTH 1228	1	130	107	105	63.17	55.65	127.6	66.48	103.64	112.35
	2	130	107	106	63.17	56.3	127.28	65.42	104.33	112.3
	AVG	130	107	105.5	63.17	55.975	127.44	65.95	103.985	112.325
HTH 1232	1	127	100	105.08	65.08	56.88	119.26	65.32	91.84	104.2
	2	127	100	105.02	64.66	57.24	118.94	65.18	91.78	104.61
	AVG	127	100	105.05	64.87	57.06	119.1	65.25	91.81	104.405
HTH 1240	1	125	92.79		56.3	48.34		63.21	88.56	92.9
	2	124	93.62		55.49	48.97		63.67	88.23	92.88
	AVG	124.5	93.205	PMD	55.895	48.655	PMD	63.44	88.395	92.89
HTH 1385	1				48.06	33.62			77.59	78.66
	2				48.49	33.13			78.44	79.02
	AVG	PMD	PMD	PMD	48.275	33.375	PMD	PMD	78.015	78.84
HTH 1435	1		82	66.16	37.48	29.12	85.23	42.4	92.9	89.85
	2		83	66.5	36.99	29.26	84.87	41.15	93.69	89.56
	AVG	PMD	82.5	66.33	37.235	29.19	85.05	41.775	93.295	89.705

Specimen ID	#	n-ns	al-al	d-ec (L)	d-ec (R)	d-fmt (L)	d-fmt (R)	OBH (L)	OBH (R)	ec-ec
HTH 0721	1	51.8		39.89	38.88	40.63	40.01	36.19	34.15	
	2	52.8		40.21	39.9	40.73	39.7	35.12	33.99	
	AVG	52.3	PMD	40.05	39.39	40.68	39.855	35.655	34.07	PMD
HTH 0872	1	42.1	23.24	35.39	34.94	34.98	35.33	34.33	34.76	86.43
	2	42.44	22.92	35.39	35.11	35.1	35.63	35.2	34.86	86.62
	AVG	42.27	23.08	35.39	35.025	35.04	35.48	34.765	34.81	86.525
HTH 1012	1	44.64		38	37.76	37.3	38.36	33.1	33.82	
	2	44.52		37.59	38.75	37.83	38.12	33.34	33.79	
	AVG	44.58	PMD	37.795	38.255	37.565	38.24	33.22	33.805	PMD
HTH 1041	1	46.75	23.33	37.51	37.96	36.18	37.27	33.79	33.51	90.53
	2	46.99	22.92	37.8	37.12	36.31	37.13	34.28	33.38	90.68
	AVG	46.87	23.125	37.655	37.54	36.245	37.2	34.035	33.445	90.605
HTH 1074	1	31.59	21.07	33.36	33.66	33.22	33.12	34.28	33.98	88.41
	2	32.11	20.96	33.15	32.66	32.47	32.28	34.35	34.34	88.85
	AVG	31.85	21.015	33.255	33.16	32.845	32.7	34.315	34.16	88.63
HTH 1097	1	48.86	24.58	43.04	43.5	42.69	43.36	35.86	35.11	102.82
	2	48.1	24.89	42.83	43.04	42.64	42.96	35.67	35.85	102.31
	AVG	48.48	24.735	42.935	43.27	42.665	43.16	35.765	35.48	102.565
HTH 1098	1	30.62	19.45	35.01	34.85	34.78	35.72	31.71	32.02	86.12
	2	31.26	19.87	34.68	34.5	35.41	36.08	31.85	31.94	85.66
	AVG	30.94	19.66	34.845	34.675	35.095	35.9	31.78	31.98	85.89
HTH 1115	1	35	19	33.12	32.64	33.5	33.23	30.17	30.64	80.04
	2	34.42	19.78	33.4	32.6	33.52	33.78	30.84	30.34	78.93
	AVG	34.71	19.39	33.26	32.62	33.51	33.505	30.505	30.49	79.485
HTH 1156	1	38.86	19.76	35.6	35.02	35.39	35.23	34.4	34.63	85.97
	2	39.18	19.24	35.19	35.15	36.28	35.54	34.94	34.5	86.01
	AVG	39.02	19.5	35.395	35.085	35.835	35.385	34.67	34.565	85.99
HTH 1168	1		14.9	26.21	28.4	26.7	27.85	29.29	28.67	72.6
	2		14.55	26.96	27.45	26.57	26.97	29.7	29.24	72.18
	AVG	PMD	14.725	26.585	27.925	26.635	27.41	29.495	28.955	72.39
HTH 1228	1	52.18	22.89	40.53	40.42	40.44	40.85	33.37	30.86	102.9
	2	51.77	23.01	40.48	40.69	40.59	41	32.92	31	102.61
	AVG	51.975	22.95	40.505	40.555	40.515	40.925	33.145	30.93	102.755
HTH 1232	1	49.58	28.79	38.67	36.93	39.02	37.39	32.39	31.46	99.09
	2	49.79	28.98	39.43	37.33	39.18	37.39	32.4	31.5	99.81
	AVG	49.685	28.885	39.05	37.13	39.1	37.39	32.395	31.48	99.45
HTH 1240	1	47.03	21.77	37.63	36.96	36.44	35.3	32.96	33.92	86.19
	2	48.51	20.84	36.98	36.51	36.99	35.84	33.95	33.6	86.37
	AVG	47.77	21.305	37.305	36.735	36.715	35.57	33.455	33.76	86.28
HTH 1385	1					31.57	31.6			
	2					30.7	31.69			
	AVG	PMD	PMD	PMD	PMD	31.135	31.645	PMD	PMD	PMD
HTH 1435	1	32.25	13.94	32.37	34.37	34	36.12	33.88	34.25	80.93
	2	31.96	13.49	31.87	33.3	33.96	35.74	34.07	34.32	80.76
	AVG	32.105	13.715	32.12	33.835	33.98	35.93	33.975	34.285	80.845

Specimen ID	#	d-d	n-b	b-l	l-o	ba-o	FOB	MDH (L)	MDH (R)	ASB	ZMB
HTH 0721	1		113.28	113.16	97.65	38.87	31.96	27.75	29.69	112.41	
	2		112.46	113.39	98.3	38.86	31.23	27.05	28.75	112.48	
	AVG	PMD	112.87	113.275	97.975	38.865	31.595	27.4	29.22	112.445	PMD
HTH 0872	1	19.46	99.35	103.67	94.45	30.01	25.02	20.89	22.17	102.03	80.2
	2	19.77	99.41	102.3	94.57	30.03	25.17	20.28	22.41	101.96	80.59
	AVG	19.615	99.38	102.985	94.51	30.02	25.095	20.585	22.29	101.995	80.395
HTH 1012	1		98.05	115.83	85.17	32.26	27.41	31.71	30.09	101.08	
	2		98.12	115.79	85.24	31.78	28.03	30.95	29.96	101.32	
	AVG	PMD	98.085	115.81	85.205	32.02	27.72	31.33	30.025	101.2	PMD
HTH 1041	1	22.16	104.7	106.01	88.78	33.77	29.38	22.13	20.6	99.59	83.82
	2	20.82	104.61	105.01	89.07	34.15	29.35	21.72	21.34	99.61	83.75
	AVG	21.49	104.655	105.51	88.925	33.96	29.365	21.925	20.97	99.6	83.785
HTH 1074	1	25.5	106.06	119.45	87.71	29.53		20.09	22.76	109.02	74.86
	2	24.85	106.65	119.93	87.64	29.41		20.09	22.77	108.63	74.63
	AVG	25.175	106.355	119.69	87.675	29.47	PMD	20.09	22.765	108.825	74.745
HTH 1097	1	23.79	110.88	123.03	94.44	35.3	29.37	34.51	31.53	106.87	92.17
	2	24.05	110.99	123.22	94.53	35.53	29.85	35.01	31.73	106.64	92.67
	AVG	23.92	110.935	123.125	94.485	35.415	29.61	34.76	31.63	106.755	92.42
HTH 1098	1	19.98	93.16	100.26	83.05	30.33	26.29	15.09	14.68	92.57	71.62
	2	18.95	92.87	100.77	82.94	30.34	26.24	15.06	15.96	92.63	71.83
	AVG	19.465	93.015	100.515	82.995	30.335	26.265	15.075	15.32	92.6	71.725
HTH 1115	1	16.38	89.2	104.58				18.71	19.68	103.58	71.76
	2	15.58	88.4	104.55				19.67	19.54	103.74	72.75
	AVG	15.98	88.8	104.565	MISS	MISS	MISS	19.19	19.61	103.66	72.255
HTH 1156	1	19.13	99.13	99.88	92.32			22.31	23.01	103.53	82
	2	20.78	99.13	99.4	92.77			21.5	22.45	104.22	82.28
	AVG	19.955	99.13	99.64	92.545	PMD	PMD	21.905	22.73	103.875	82.14
HTH 1168	1	17.27									
	2	17.6									
	AVG	17.435	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD
HTH 1228	1	27.04	107.57	108.09	87.11	44.74	34.56	28.3	28.87	110.26	94.34
	2	26.22	107.25	108.08	87.33	44.52	35.03	29.3	28.13	110.61	94.19
	AVG	26.63	107.41	108.085	87.22	44.63	34.795	28.8	28.5	110.435	94.265
HTH 1232	1	26.12	105.46	115.79	91.24	33.43	29.05	27.4	26.69	99.25	94.47
	2	25.79	105.74	115.74	91.25	34.06	28.82	27.67	26.44	99.28	93.44
	AVG	25.955	105.6	115.765	91.245	33.745	28.935	27.535	26.565	99.265	93.955
HTH 1240	1	16.42	103.83			34.38	26	26.42	28.43		82
	2	16.48	104.47			34.36	26.07	25.42	27.38		82.24
	AVG	16.45	104.15	OSSICLE	OSSICLE	34.37	26.035	25.92	27.905	PMD	82.12
HTH 1385	1	18.01	92.56	100.36				13.25	12.27	84.19	
	2	17.79	92.24	100.42				12.62	13.08	84.25	
	AVG	17.9	92.4	100.39	PMD	PMD	PMD	12.935	12.675	84.22	PMD
HTH 1435	1	21.25				26.69	23.26	13.36	16.09		
	2	21.07				26.76	23.05	12.43	15.46		
	AVG	21.16	PMD	PMD	PMD	26.725	23.155	12.895	15.775	PMD	PMD

Specimen ID	#	MOW	Circ	Sag Arc	Fro H Arc	Par H Arc	Occip H Arc	L Eye Circ	R Eye Circ	Occip Arc	mid-ParHArc (L)
HTH 0721	1		522			125	127	127	127	131	118
	2		522			125	127	128	126	132	119
	AVG	PMD	522	PMD	PMD	125	127	127.5	126.5	131.5	118.5
HTH 0872	1	50.3	469		117	113	118	110	108	125	110
	2	49.2	470		118	114	118	109	109	124	111
	AVG	49.75	469.5	PMD	117.5	113.5	118	109.5	108.5	124.5	110.5
HTH 1012	1		478				104	118	114	124	108
	2		477				104	117	115	125	109
	AVG	PMD	477.5	PMD	PMD	PMD	104	117.5	114.5	124.5	108.5
HTH 1041	1	50.65	472			117		112	114	122	106
	2	50.14	472			117		113	114	122	105
	AVG	50.395	472	PMD	PMD	117	PMD	112.5	114	122	105.5
HTH 1074	1	49.74	504	372	128	135	109	104	105	127	131
	2	50.45	502	372	128	135	109	104	105	126	132
	AVG	50.095	503	372	128	135	109	104	105	126.5	131.5
HTH 1097	1	62.34	523			133			130	129	120
	2	62.28	522			133			129	130	119
	AVG	62.31	522.5	PMD	PMD	133	PMD	PMD	129.5	129.5	119.5
HTH 1098	1	44.72	430	322	109	116	97	110	108	110	115
	2	44.44	429	322	109	116	97	109	108	110	114
	AVG	44.58	429.5	322	109	116	97	109.5	108	110	114.5
HTH 1115	1	45.17	432		105	122		104	101		111
	2	44.54	433		106	121		103	100		112
	AVG	44.855	432.5	MISS	105.5	121.5	MISS	103.5	100.5	MISS	111.5
HTH 1156	1	50.86	PMD	337	116	109	112	105	106		124
	2	51.66		337	116	109	112	105	105		123
	AVG	51.26	PMD	337	116	109	112	105	105.5	PMD	123.5
HTH 1168	1										105
	2										105
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD	105
HTH 1228	1	58.76	516			120		123	121	133	114
	2	59.27	516			120		122	120	133	115
	AVG	59.015	516	PMD	PMD	120	PMD	122.5	120.5	133	114.5
HTH 1232	1	63.88	493	358	120	128	110	116	116	117	116
	2	63.87	494	358	120	128	110	115	115	117	115
	AVG	63.875	493.5	358	120	128	110	115.5	115.5	117	115.5
HTH 1240	1	46.93		350	119	OSSICLE	OSSICLE	114	117		117
	2	46.51		350	119	OSSICLE	OSSICLE	113	117		118
	AVG	46.72	PMD	350	119	OSSICLE	OSSICLE	113.5	117	PMD	117.5
HTH 1385	1			327	111	117	99				122
	2			326	111	116	99				122
	AVG	PMD	PMD	326.5	111	116.5	99	PMD	PMD	PMD	122
HTH 1435	1	42.44						103			
	2	41.79						103			
	AVG	42.115	PMD	PMD	PMD	PMD	PMD	103	PMD	PMD	PMD

Specimen ID	#	mid-ParHArc (R)	mid-ParHCho (L)	mid-ParHCho (R)	Par B Arc (L)	Par B Arc (R)	Par B Cho (L)	Par B Cho (R)	Fro B Cho
HTH 0721	1	118	102.73	100.69	137	139	121.6	122.23	107
	2	117	101.87	101.18	137	139	120.98	122.2	106
	AVG	117.5	102.3	100.935	137	139	121.29	122.215	106.5
HTH 0872	1	114	95.27	92.87					
	2	113	95.93	91.35					
	AVG	113.5	95.6	92.11	PMD	PMD	PMD	PMD	PMD
HTH 1012	1	107	95.94	93.78	124	126	113.33	105.69	
	2	108	96.83	94.34	123	125	112.36	106.18	
	AVG	107.5	96.385	94.06	123.5	125.5	112.845	105.935	PMD
HTH 1041	1	110	89.51	88.21	124	131	108.2	112.42	98
	2	109	89.58	87.96	123	130	108.64	111.55	98
	AVG	109.5	89.545	88.085	123.5	130.5	108.42	111.985	98
HTH 1074	1	121	105.49	98.26	135	135	108.9	105.55	89
	2	120	105.28	99.27	136	136	109.47	105.53	89
	AVG	120.5	105.385	98.765	135.5	135.5	109.185	105.54	89
HTH 1097	1	115	103.57	96.31	138	149	123.06	125.84	109
	2	116	103.08	97.19	137	150	122.61	126.26	109
	AVG	115.5	103.325	96.75	137.5	149.5	122.835	126.05	109
HTH 1098	1	118	96.83	96.01	121	122	104.5	102.88	91
	2	117	96.76	96.75	120	121	103.94	102.82	90
	AVG	117.5	96.795	96.38	120.5	121.5	104.22	102.85	90.5
HTH 1115	1	119	97.36	98.21	119	119	104.85	100.58	86
	2	119	96.14	97.7	118	119	103.52	99.97	85
	AVG	119	96.75	97.955	118.5	119	104.185	100.275	85.5
HTH 1156	1		103.12		126	122	105.62	108.01	98
	2		102.52		125	123	105.89	107.41	98
	AVG	PMD	102.82	PMD	125.5	122.5	105.755	107.71	98
HTH 1168	1		85.57		111		95.43		
	2		86		110		94.48		
	AVG	PMD	85.785	PMD	110.5	PMD	94.955	PMD	PMD
HTH 1228	1	117	97.97	101.2	124	125	112.12	113.9	114
	2	117	98.86	100.35	123	126	111.4	112.97	114
	AVG	117	98.415	100.775	123.5	125.5	111.76	113.435	114
HTH 1232	1	111	100.32	98.8	134	130	117.61	113.02	105
	2	110	100.69	98.55	132	129	116.3	113.07	106
	AVG	110.5	100.505	98.675	133	129.5	116.955	113.045	105.5
HTH 1240	1		98.7		129	129	111.76	112.41	
	2		99.76		130	128	111.33	111.04	
	AVG	PMD	99.23	PMD	129.5	128.5	111.545	111.725	PMD
HTH 1385	1	120	95.7	98.19	129	119	107.06	97.6	
	2	120	96.13	98.22	129	119	106.42	98.01	
	AVG	120	95.915	98.205	129	119	106.74	97.805	PMD
HTH 1435	1								
	2								
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD

Specimen ID	Sex	Age (years)	Ancestry	Year Died	Cause of Death	#	g-op	eu-eu	zy-zy
HTH 1441	M	10	B	1926	Pericarditis	1			
						2			
						AVG	PMD	PMD	PMD
HTH 1557	M	3	B	1927	Bronchial pneumonia	1			
						2			
						AVG	PMD	PMD	PMD
HTH 1688	M	10	B	1928	Diphtheria	1	167	133	109
						2	168	134	109
						AVG	167.5	133.5	109
HTH 1772	F	12	W	1928	Pulmonary TB	1	167	144	118
						2	166	145	119
						AVG	166.5	144.5	118.5
HTH 1784	M	6	B	1928	Splenomegaly	1	177		
						2	177		
						AVG	177	PMD	PMD
HTH 1834	M	8	B	1929	TB Peritonitis	1	164	131	107
						2	165	131	107
						AVG	164.5	131	107
HTH 1894	M	1	B	1929	Bronchial pneumonia	1			
						2			
						AVG	PMD	PMD	PMD
HTH 1950	M	4	B	1930	Pertussis	1	161	121	
						2	160	120	
						AVG	160.5	120.5	PMD
HTH 2036	F	7	W	1930	Still's disease	1			
						2			
						AVG	PMD	PMD	PMD
HTH 2074	F	8	B	1931	Pulmonary TB	1	175		108
						2	174		108
						AVG	174.5	PMD	108
HTH 2075	M	1	B	1931	Sepsis	1			
						2			
						AVG	PMD	PMD	PMD
HTH 2104	M	20	B	1931	Murdered	1	174	131	126
						2	174	131	126
						AVG	174	131	126
HTH 2118	F	13	B	1931	Pericarditis	1	166	121	111
						2	167	122	111
						AVG	166.5	121.5	111
HTH 2135	F	14	B	1931	TB Meningitis	1	181	140	116
						2	182	140	116
						AVG	181.5	140	116
HTH 2144	M	6	B	1931	Streptococcal Meningitis	1			
						2			
						AVG	PMD	PMD	PMD

Specimen ID	#	ba-b	ba-n	ba-pr	ecm-ecm	pr-alv	AUB	n-pr	ft-ft	fmt-fmt
HTH 1441	1				61.56	45.04		59.56	95.69	95.82
	2				62.56	45.93		59.54	95.8	96.69
	AVG	PMD	PMD	PMD	62.06	45.485	PMD	59.55	95.745	96.255
HTH 1557	1				48.95	37.35		46.95	80.58	79.71
	2				48.12	37.56		46.95	79.84	79.37
	AVG	PMD	PMD	PMD	48.535	37.455	PMD	46.95	80.21	79.54
HTH 1688	1	131	88	82.46	60.21	42.27	109.55	54.34	88.01	90.23
	2	130	87	82.21	60.19	42.64	109.34	54.35	88.4	90.18
	AVG	130.5	87.5	82.335	60.2	42.455	109.445	54.345	88.205	90.205
HTH 1772	1	135	94	82.12		39.77	105.86	61.15	89.52	90.57
	2	136	93	81.64		39.92	105.68	60.54	89.06	90.65
	AVG	135.5	93.5	81.88	PMD	39.845	105.77	60.845	89.29	90.61
HTH 1784	1					43.37		52.79		
	2					42.55		53.44		
	AVG	PMD	PMD	PMD	PMD	42.96	PMD	53.115	PMD	PMD
HTH 1834	1	120	83	83.87	60.24	44.42	106.17	50.75	89.7	92.15
	2	120	84	83.7	60.52	44.72	106.26	51.79	90.14	92.17
	AVG	120	83.5	83.785	60.38	44.57	106.215	51.27	89.92	92.16
HTH 1894	1				45.08	28.26		44.19	75.2	74.2
	2				45.67	29.39		44.4	76.28	73.74
	AVG	PMD	PMD	PMD	45.375	28.825	PMD	44.295	75.74	73.97
HTH 1950	1	110	103				86.25		81.91	79.37
	2	109	102				86.07		81.56	79.77
	AVG	109.5	102.5	PMD	PMD	PMD	86.16	PMD	81.735	79.57
HTH 2036	1									
	2									
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD
HTH 2074	1	121	83	79.65		40.66		53.22	91.86	90.95
	2	121	82	79.46		40.97		52.6	92.44	91.6
	AVG	121	82.5	79.555	PMD	40.815	PMD	52.91	92.15	91.275
HTH 2075	1				46.4	31.15		39.97	81.01	81.74
	2				45.93	32.22		39.48	81.18	81.78
	AVG	PMD	PMD	PMD	46.165	31.685	PMD	39.725	81.095	81.76
HTH 2104	1	131	105	111	64.71	59.09	110.87	65.03	89.35	102.98
	2	131	105	111	64.62	59.33	110.9	65.62	89.01	103.65
	AVG	131	105	111	64.665	59.21	110.885	65.325	89.18	103.315
HTH 2118	1	118	84	81.72	58.92	43.87	108.27	58.94	91.24	94.32
	2	118	84	81.73	58.62	43.61	108.32	58.38	90.94	94.48
	AVG	118	84	81.725	58.77	43.74	108.295	58.66	91.09	94.4
HTH 2135	1	123	93	96.54	58.1	53.46	110.5	65.59	90.88	98.65
	2	132	93	96.12	58.37	53.56	110.65	65.09	91.28	98.08
	AVG	127.5	93	96.33	58.235	53.51	110.575	65.34	91.08	98.365
HTH 2144	1				54.84	40.14		56.99	95.48	94.93
	2				55.29	40		56.07	95.45	94.93
	AVG	PMD	PMD	PMD	55.065	40.07	PMD	56.53	95.465	94.93

Specimen ID	#	n-ns	al-al	d-ec (L)	d-ec (R)	d-fmt (L)	d-fmt (R)	OBH (L)	OBH (R)	ec-ec
HTH 1441	1	43.7	22.94	33.71	34.45	34.51	33.45	34.59	33.55	91.9
	2	43.14	23.02	34.09	35.5	34.39	34.87	34.34	33.3	91.71
	AVG	43.42	22.98	33.9	34.975	34.45	34.16	34.465	33.425	91.805
HTH 1557	1	32.98	17.82	30.46	31.41	30.14	30.87	29.84	28.09	77.88
	2	32.92	18.64	31.52	30.65	29.88	30.67	30.16	28.33	76.9
	AVG	32.95	18.23	30.99	31.03	30.01	30.77	30	28.21	77.39
HTH 1688	1	40.34	19.58	36.63	36.92	37.17	36.81	33.32	31.99	86.03
	2	40.36	18.72	37.12	36.87	37.16	36.79	33.58	32.43	85.94
	AVG	40.35	19.15	36.875	36.895	37.165	36.8	33.45	32.21	85.985
HTH 1772	1	44.25		38	38.07	34.98	36.84	35.82	34.18	85.75
	2	44.04		37.91	37.91	35.6	36.82	35.31	34.11	84.83
	AVG	44.145	PMD	37.955	37.99	35.29	36.83	35.565	34.145	85.29
HTH 1784	1	37.74		37.1		35.57		30.2		
	2	37.41		37.25		35.81		30.16		
	AVG	37.575	PMD	37.175	PMD	35.69	PMD	30.18	PMD	PMD
HTH 1834	1	38.4	21.33	35.3	35.36	34.81	34.78	32.85	33.37	86.94
	2	39.04	21.32	35.47	35.18	34.87	34.82	32.85	33.12	88.33
	AVG	38.72	21.325	35.385	35.27	34.84	34.8	32.85	33.245	87.635
HTH 1894	1	31.79	17.94	30.36	31.94	30.04	31.31	29.29	28.59	74.07
	2	32.01	18.02	30.21	32.07	29.8	31.28	29.95	28.64	74.01
	AVG	31.9	17.98	30.285	32.005	29.92	31.295	29.62	28.615	74.04
HTH 1950	1	31.89		30.93		31.47	31.08	29.53		
	2	30.5		31.71		31.61	30.9	29.97		
	AVG	31.195	PMD	31.32	PMD	31.54	30.99	29.75	PMD	PMD
HTH 2036	1	35.03			35.33		34.79		26.68	
	2	35.14			36.14		34.66		26.57	
	AVG	35.085	PMD	PMD	35.735	PMD	34.725	PMD	26.625	PMD
HTH 2074	1	39.25	21.29	34.83	35.8	35.18	35.31	33.88	32.97	83.3
	2	39.01	21.91	35.5	36.8	35.04	35.37	34.28	33.9	82.8
	AVG	39.13	21.6	35.165	36.3	35.11	35.34	34.08	33.435	83.05
HTH 2075	1	29.41	17.15	30.94	31.98	30.96	31.76	31.68	30.99	79.04
	2	29.1	17.84	30.88	31.95	30.87	32.13	31.66	31.21	78.87
	AVG	29.255	17.495	30.91	31.965	30.915	31.945	31.67	31.1	78.955
HTH 2104	1	49.93	25.07	35.14	36.05	37.72	37.09	32.84	31.36	95.2
	2	50.35	25	35.22	36.14	37.31	37.68	33.12	31.34	95.02
	AVG	50.14	25.035	35.18	36.095	37.515	37.385	32.98	31.35	95.11
HTH 2118	1	40.54	20.73	37.67	38.03	36.71	37.95	33.06	33.47	89.26
	2	40.68	20.76	37.68	38.53	36.94	38.22	33.34	33.75	89
	AVG	40.61	20.745	37.675	38.28	36.825	38.085	33.2	33.61	89.13
HTH 2135	1	47.49	21.6	37.49	35.73	36.19	36.73	37.04	34.69	93.05
	2	47.07	21.69	38.06	36.97	37.58	37.57	36.8	34.52	93.61
	AVG	47.28	21.645	37.775	36.35	36.885	37.15	36.92	34.605	93.33
HTH 2144	1	35.93	21.11	33.37	34.61	34.19	34.36	33.01	32.72	86.65
	2	35.86	21.14	33.68	33.37	34.01	34.88	32.67	32.41	86.73
	AVG	35.895	21.125	33.525	33.99	34.1	34.62	32.84	32.565	86.69

Specimen ID	#	d-d	n-b	b-l	l-o	ba-o	FOB	MDH (L)	MDH (R)	ASB	ZMB
HTH 1441	1	24.92		116.85	85.14	36.25	29.19	18.5	18.05		82.84
	2	24.98		116.93	84.84	36.23	29.17	18.95	19.02		82.52
	AVG	24.95	PMD	116.89	84.99	36.24	29.18	18.725	18.535	PMD	82.68
HTH 1557	1	17.53	98.84	105.25	97.46		24.63	14.87	15.09		66.76
	2	17.91	98.76	105.59	97.29		24.97	15.11	15.85		67.63
	AVG	17.72	98.8	105.42	97.375	PMD	24.8	14.99	15.47	PMD	67.195
HTH 1688	1	14.6	101.98	112.92	100.42	37.69	24.87	18.11	19.73	108.12	70.72
	2	14.44	102.38	113.64	100.78	38.16	25.84	18.94	19.56	108.49	71.3
	AVG	14.52	102.18	113.28	100.6	37.925	25.355	18.525	19.645	108.305	71.01
HTH 1772	1	15.57	108.21	107.24	96.23	34.44	27.51	18.71	22.28	109.33	
	2	15.57	107.4	106.15	97.37	34.56	27.63	18.54	22.66	108.99	
	AVG	15.57	107.805	106.695	96.8	34.5	27.57	18.625	22.47	109.16	PMD
HTH 1784	1		110.64	119.5	90.53			22.74			
	2		110.47	119.4	90.67			21.84			
	AVG	PMD	110.555	119.45	90.6	PMD	PMD	22.29	PMD	PMD	PMD
HTH 1834	1	20.38	98.19	111.01	92.29	33.31	26.12	21.47	22.65	99.92	81.01
	2	21.13	97.79	111.06	92.87	33.22	26.31	21.25	22.73	99.58	81.09
	AVG	20.755	97.99	111.035	92.58	33.265	26.215	21.36	22.69	99.75	81.05
HTH 1894	1	13.79									62.67
	2	13.73									61.86
	AVG	13.76	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD	62.265
HTH 1950	1	19.15	103.5	104.32	83.32	31.08	24.31	12.77	14.75	91.21	
	2	18.51	103.47	105.03	83.01	30.47	24.1	11.98	15.25	91.18	
	AVG	18.83	103.485	104.675	83.165	30.775	24.205	12.375	15	91.195	PMD
HTH 2036	1		96.45	104.25	83.63				17.68	PMD	
	2		96.38	104	83.65				17.31		
	AVG	PMD	96.415	104.125	83.64	PMD	PMD	PMD	17.495	PMD	PMD
HTH 2074	1	17.88	98.72	113.57	99.51	34.51		18.27	19.19		78.58
	2	17.4	99.31	113.91	100.38	34.4		18.62	18.62		78.74
	AVG	17.64	99.015	113.74	99.945	34.455	PMD	18.445	18.905	PMD	78.66
HTH 2075	1	18.98	88.16	97.02	81.98			9.49	9.93		63.41
	2	19.25	89.39	96.58	82			8.56	9.66		63.91
	AVG	19.115	88.775	96.8	81.99	PMD	PMD	9.025	9.795	PMD	63.66
HTH 2104	1	24.92	104.86	110.8	93.74	34.44	30.07	25.02	26.65	104.55	93.42
	2	25.25	105.16	110.81	93.78	34.45	29.48	25.19	25.96	104.71	93.87
	AVG	25.085	105.01	110.805	93.76	34.445	29.775	25.105	26.305	104.63	93.645
HTH 2118	1	19.11	99.84	106.74	91.66	33.8	26.11	20.54	21.96	105.78	78.23
	2	18.63	99.72	106.97	91.69	33.27	27.04	19.54	22.43	105.62	78.27
	AVG	18.87	99.78	106.855	91.675	33.535	26.575	20.04	22.195	105.7	78.25
HTH 2135	1	25.37	117.05	114.17	86.96	37.21	27.68	24.58	22.91	94.52	78.72
	2	24.73	117.25	114.58	87	37.07	27.61	25.22	22.29	94.75	77.09
	AVG	25.05	117.15	114.375	86.98	37.14	27.645	24.9	22.6	94.635	77.905
HTH 2144	1	24.39		101.76	86.19	31.23	22.97	18.08	18.81	91.24	72.02
	2	24.62		102.17	86.22	30.75	22.86	18.55	18.7	91.99	72.61
	AVG	24.505	PMD	101.965	86.205	30.99	22.915	18.315	18.755	91.615	72.315

Specimen ID	#	MOW	Circ	Sag Arc	Fro H Arc	Par H Arc	Occip H Arc	L Eye Circ	R Eye Circ	Occip Arc	mid-ParHArc (L)
HTH 1441	1	57.94				132	99	115	114	122	
	2	58.03				133	99	115	113	123	
	AVG	57.985	PMD	PMD	PMD	132.5	99	115	113.5	122.5	PMD
HTH 1557	1	39.3			120	116	125	95	97		129
	2	39.71			121	116	125	96	96		128
	AVG	39.505	PMD	0	120.5	116	125	95.5	96.5	PMD	128.5
HTH 1688	1	44.22	491	362	118	127	117	112	115	126	124
	2	44.45	490	362	119	127	116	113	114	127	123
	AVG	44.335	490.5	362	118.5	127	116.5	112.5	114.5	126.5	123.5
HTH 1772	1		499	360	128	119	113	114		128	131
	2		499	359	127	118	114	115		128	131
	AVG	PMD	499	359.5	127.5	118.5	113.5	114.5	PMD	128	131
HTH 1784	1			379	138	135	107	106			120
	2			379	138	135	106	106			120
	AVG	PMD	PMD	379	138	135	106.5	106	PMD	PMD	120
HTH 1834	1	52.84	474	346	114	123	109	108	108	117	117
	2	51.36	475	346	114	123	109	107	109	117	118
	AVG	52.1	474.5	346	114	123	109	107.5	108.5	117	117.5
HTH 1894	1	37.71						93	93		
	2	38.31						93	93		
	AVG	38.01	PMD	PMD	PMD	PMD	PMD	93	93	PMD	PMD
HTH 1950	1		459		130	118	101	98		107	
	2		460		131	118	102	99		106	
	AVG	PMD	459.5	PMD	130.5	118	101.5	98.5	PMD	106.5	PMD
HTH 2036	1				114	114	95		101		
	2				114	113	95		100		
	AVG	PMD	PMD	PMD	114	113.5	95	PMD	100.5	PMD	PMD
HTH 2074	1	53.78			117	127	122	105	105		117
	2	53.91			117	126	122	106	104		118
	AVG	53.845	PMD	PMD	117	126.5	122	105.5	104.5	PMD	117.5
HTH 2075	1	41.37			106	108	97	98	102		123
	2	40.29			105	107	97	99	102		124
	AVG	40.83	PMD	PMD	105.5	107.5	97	98.5	102	PMD	123.5
HTH 2104	1	55.66	486			130		113	113	127	120
	2	55.64	486			129		112	114	127	120
	AVG	55.65	486	PMD	PMD	129.5	PMD	112.5	113.5	127	120
HTH 2118	1	50.45	467	344	115	116	113	111	112	119	109
	2	50.55	467	344	116	116	113	111	111	120	109
	AVG	50.5	467	344	115.5	116	113	111	111.5	119.5	109
HTH 2135	1	52.68	509	364	135	128	99	110	111	105	130
	2	52.54	509	364	135	128	99	111	112	104	130
	AVG	52.61	509	364	135	128	99	110.5	111.5	104.5	130
HTH 2144	1	56.33				112		108	107		
	2	56.49				113		109	107		
	AVG	56.41	PMD	PMD	PMD	112.5	PMD	108.5	107	PMD	PMD

Specimen ID	#	mid-ParHArc (R)	mid-ParHCho (L)	mid-ParHCho (R)	Par B Arc (L)	Par B Arc (R)	Par B Cho (L)	Par B Cho (R)	Fro B Cho
HTH 1441	1								
	2								
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD
HTH 1557	1	130	103.57	104.6	138	128	116.28	112.37	
	2	129	103.48	103.78	139	127	116.18	112.36	
	AVG	129.5	103.525	104.19	138.5	127.5	116.23	112.365	PMD
HTH 1688	1	124	102.78	103.79	143	144	120.9	117.18	92
	2	124	103.97	104.23	142	143	121.27	116.67	93
	AVG	124	103.375	104.01	142.5	143.5	121.085	116.925	92.5
HTH 1772	1	135	109.49	111.03	132	133	117.35	114.34	103
	2	136	108.73	111.46	133	133	116.6	114.06	104
	AVG	135.5	109.11	111.245	132.5	133	116.975	114.2	103.5
HTH 1784	1		103.45		139		119.25		
	2		103.85		140		118.69		
	AVG	PMD	103.65	PMD	139.5	PMD	118.97	PMD	PMD
HTH 1834	1	119	102.15	101.36	126	126	112.13	106.94	100
	2	119	101.97	102.22	126	125	112.82	106.83	99
	AVG	119	102.06	101.79	126	125.5	112.475	106.885	99.5
HTH 1894	1								
	2								
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD
HTH 1950	1								
	2								
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD
HTH 2036	1	121		99.89		123	PMD	104.03	
	2	120		99.85		122		103.69	
	AVG	120.5	PMD	99.87	PMD	122.5	PMD	103.86	PMD
HTH 2074	1	119	98.27	101.93	132	129	114.67	113.87	
	2	120	98.57	101.99	133	129	114.74	112.84	
	AVG	119.5	98.42	101.96	132.5	129	114.705	113.355	PMD
HTH 2075	1	129	97.84	101.02	129	126	107.23	106.19	80
	2	129	98.6	100.79	128	125	106.97	105.81	81
	AVG	129	98.22	100.905	128.5	125.5	107.1	106	80.5
HTH 2104	1	123	103.71	101.46	132	129	116.65	111.01	102
	2	123	103.12	101.69	131	128	115.91	111.49	101
	AVG	123	103.415	101.575	131.5	128.5	116.28	111.25	101.5
HTH 2118	1	109	93.6	91.25	119	117	107.95	101.92	99
	2	108	94.18	91.42	119	117	107.04	102.58	99
	AVG	108.5	93.89	91.335	119	117	107.495	102.25	99
HTH 2135	1	131	106.65	101.99	147	145	121.05	120.64	101
	2	130	105.55	100.54	147	146	120.71	119.75	101
	AVG	130.5	106.1	101.265	147	145.5	120.88	120.195	101
HTH 2144	1								
	2								
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD

Specimen ID	Sex	Age (years)	Ancestry	Year Died	Cause of Death	#	g-op	eu-eu	zy-zy
HTH 2310	M	15	B	1932	Lobar pneumonia	1	184	138	129
						2	185	137	129
						AVG	184.5	137.5	129
HTH 2370	M	1	B	1933	Bronchial pneumonia	1			
						2			
						AVG	PMD	PMD	PMD
HTH 2714	F	1	B	1935	Pertussis	1	137		
						2	138		
						AVG	137.5	PMD	PMD
HTH 3112	M	15	B	1937	Brain abscess	1	186	136	121
						2	185	136	121
						AVG	185.5	136	121

Specimen ID	#	ba-b	ba-n	ba-pr	ecm-ecm	pr-alv	AUB	n-pr	ft-ft	fmt-fmt
HTH 2310	1				65.37	53.43	122.06	69.39	99.04	106.27
	2				65.15	53.08	122.31	69.51	99.06	106.89
	AVG	PMD	PMD	PMD	65.26	53.255	122.185	69.45	99.05	106.58
HTH 2370	1				43.76	29.22		45.11	73.96	73.16
	2									
	AVG	PMD	PMD	PMD	21.88	14.61	PMD	22.555	36.98	36.58
HTH 2714	1				41.61	28.26		38.95		
	2				42.15	28.94		39.52		
	AVG	PMD	PMD	PMD	41.88	28.6	PMD	39.235	PMD	PMD
HTH 3112	1	133	95	92	59.47	47.82	112.04	65.15	104.51	106.04
	2	132	95	91	59.74	47.12	112.69	66.02	104.73	105.89
	AVG	132.5	95	91.5	59.605	47.47	112.365	65.585	104.62	105.965

Specimen ID	#	n-ns	al-al	d-ec (L)	d-ec (R)	d-fmt (L)	d-fmt (R)	OBH (L)	OBH (R)	ec-ec
HTH 2310	1	50.4	25.73	39.38	39.94	40.45	41.18	34.71	33.79	97.52
	2	49.59	25.97	39.69	40.3	40.69	41.45	34.44	34	97.72
	AVG	49.995	25.85	39.535	40.12	40.57	41.315	34.575	33.895	97.62
HTH 2370	1	34.05	15.62	29.08	29.42	28.49	29	28.21	29.76	70.24
	2									
	AVG	17.025	7.81	14.54	14.71	14.245	14.5	14.105	14.88	35.12
HTH 2714	1	27.95			29.88	28.76	30.28		27.5	
	2	27.76			30.47	28.83	30.04		27.86	
	AVG	27.855	PMD	PMD	30.175	28.795	30.16	PMD	27.68	PMD
HTH 3112	1	47.9	22.03	41.01	41.68	41.41	41.63	35.72	34.8	98.32
	2	47.37	22.7	41.13	40.82	41.46	41.86	35.34	34.2	97.44
	AVG	47.635	22.365	41.07	41.25	41.435	41.745	35.53	34.5	97.88

Specimen ID	#	d-d	n-b	b-l	l-o	ba-o	FOB	MDH (L)	MDH (R)	ASB	ZMB
HTH 2310	1	23.01		117.28		36.34	25.73	31.96	33.03	107.62	88.09
	2	22.85		115.95		36.03	25.72	31.65	32.27	108.26	87.87
	AVG	22.93	PMD	116.615	PMD	36.185	25.725	31.805	32.65	107.94	87.98
HTH 2370	1	15.66									58.25
	2										
	AVG	7.83	PMD	PMD	PMD	PMD	PMD	PMD	PMD	PMD	29.125
HTH 2714	1	13.46	82.57	94.27	76.78			13.17	12.2		
	2	13.29	82.59	94	76.92			13.04	11.63		
	AVG	13.375	82.58	94.135	76.85	PMD	PMD	13.105	11.915	PMD	PMD
HTH 3112	1	21.52	113.96	127.81	94.4	37.02	26.49	21.24	22.83		84.17
	2	21.27	114.33	128.09	94.51	37.34	26.61	22.23	21.83		84.14
	AVG	21.395	114.145	127.95	94.455	37.18	26.55	21.735	22.33	PMD	84.155

Specimen ID	#	MOW	Circ	Sag Arc	Fro H Arc	Par H Arc	Occip H Arc	L Eye Circ	R Eye Circ	Occip Arc	mid-ParHArc (L)
HTH 2310	1	48.47	516			127		121	120	123	
	2	48.11	516			127		120	121	123	
	AVG	48.29	516	PMD	PMD	127	PMD	120.5	120.5	123	PMD
HTH 2370	1	38.67						86	87		
	2							87	88		
	AVG	19.335	PMD	PMD	PMD	PMD	PMD	86.5	87.5	PMD	PMD
HTH 2714	1			303	100	111	92		89		111
	2			303	100	111	92		89		111
	AVG	PMD	PMD	303	100	111	92	PMD	89	PMD	111
HTH 3112	1	55.37	516	381	132	139	110	120	120		124
	2	54.87	517	381	131	140	110	120	120		123
	AVG	55.12	516.5	381	131.5	139.5	110	120	120	PMD	123.5

Specimen ID	#	mid-ParHArc (R)	mid-ParHCho (L)	mid-ParHCho (R)	Par B Arc (L)	Par B Arc (R)	Par B Cho (L)	Par B Cho (R)	Fro B Cho
HTH 2310	1								110
	2								110
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	110
HTH 2370	1								66
	2								
	AVG	PMD	PMD	PMD	PMD	PMD	PMD	PMD	33
HTH 2714	1		91.09		120	118	96.78	95.91	
	2		91.42		119	117	96.07	96.9	
	AVG	PMD	91.255	PMD	119.5	117.5	96.425	96.405	PMD
HTH 3112	1	119	103.3	101.58	146	141	127.98	123.43	109
	2	120	103.33	101.15	147	141	127.12	124.14	110
	AVG	119.5	103.315	101.365	146.5	141	127.55	123.785	109.5

Specimen ID	Description of Specimen
LL8	Excellent condition,complete and articulated. Minor PMD on right zygomaxillary, and slight surface wear on frontal. Thick and heavy.
LL39	Excellent condition, no PMD except for minor surface wear on frontal and parietals. Thick and heavy.
LL81	Incomplete, disarticulated (except for frontal, maxillae, zygomatics, and facial bones). PM damage on occipital, both parietals, and the frontal. Bregma not present. Maxillae have pulled away from frontal at the nasals, making eye orbit circumference and facial height measurements impossible. Significant wear.
LL83	Complete and fully articulated. Mild surface wear. Right zygomatic is broken and bent. Very slight PMD on left temporal and posterior occipital that do not interfere with measurements. Temporals are slightly flared. Very good condition.
LL204	Skull is in good condition. Some wear and surface weathering. Complete and articulated. Right zygomatic is broken and bent, left zygomatic is weathered very thin. PMD on both mastoids and on both temporal squamous portions. Very slight flaring of zygomatics. Metopic suture is completely open and unfused. Location of lambda may be compromised due to wormian bones; if this is the case, the position of lambda is 8mm superior.
LL221	Significant breakage of maxilla, left zygomatic, and sphenoid. Left eye orbit is incomplete. Left side is extremely weathered. Slight flaring of zygomatics.
LL291	Complete and articulated cranium with very little surface wear. Left side of cranium has PMD to include a large hole (40mmx20mm) in the parietal, a broken zygomatic arch, separation of the sphenoid from the frontal, and possibly some bending of the left lateral edge of the frontal (Fro B Cho was not taken for this reason). Right parietal is slightly flared.
LL301	Excellent condition, articulated and complete. Very slight temporal flaring and mild, patchy surface wear. Metopic suture less than 25% fused.
LL336	Excellent condition, complete and articulated. Minimal surface wear and slight flaring of temporals.
LL338	Right maxilla and zygomatic unfused, the rest of the cranium is loosely fused. Sutures of temporals and inferior half of occipital widening. Minimal surface wear.
LL347	Cranium is disarticulated and significantly damaged post mortem. The frontal and articulated sphenoid, and both parietals remain whole and in good enough condition to measure. Significant weathering and deterioration of bone thickness, to include flaking (did not take thicknesses for this reason).
LL365	Very good condition with wear on the outer bone surfaces. Complete and articulated. Basilar suture is not fused so the occipital has started to pull slightly away from the sphenoid.
LL369	Incomplete and mostly disarticulate. Both parietals are present and still fused together but with significant wear and damage on the posterior side (to include some warping). The frontal, sphenoid, maxillae, zygomatics facial bones, and left temporal are also still articulated and in reasonably good condition with minimal wear. The posterior section of the left temporal is damaged, to include the mastoid process.
LL371	The cranium is incomplete and missing the occipital. The right temporal is broken off and the posterior borders of both parietals are broken. Some slight weathering on left side surfaces.
LL385	Cranial vault was surgically removed postmortem. Highly fragmented, weathered, and damaged, but facial bones remain in good condition.
LL391	Cranium is in excellent condition - fully articulated and complete. Slight surface wear and temporal flaring on right side.
LL392	Cranium complete but disarticulated. Overall surface wear, but otherwise bone integrity is good. Inferior section of occipital is unfused and unattached, making o-ba measurement impossible.
LL394	Complete skull with minor surface wear and PMD on mastiods (only slight wear on the left). Good condition, with more significant wear and flaking on the posterior occipital. Small wormian bone makes certainty of ASB location unclear.
LL402	Incomplete, disarticulated, extremely weathered with excessive flaking of exterior surfaces. Some warping and thinning of bones. Maxilla missing. Significant PMD on occipital and right parietal. Decided location of opistion may be incorrect. Alveolar palate present, but infused.
LL452	Excellent condition, articulate and complete. Minor surface wear but no PMD. Slight separation of temporal-occipital suture.
LL466	Mostly complete and articulated except for unfused segment of posterior occipital that articulates with basion. Nasals missing, left zygomatic is missing and right has PMD. Fontanelle at bregma not fully formed. Bone is in good condition with minor surface wear and discoloration in small patches. Sutures between the right temporal and the sphenoid, as well as the right parietal and the frontal are separating. Hint of metopic suture near superciliary arches.
LL516	Complete and fully articulated. Heavy surface wear. PMD on right inferior occipital with some slight separation of suture on that side. Basilar suture is unfused and also pulled slightly away from sphenoid.

Specimen ID	Description
LL521	Cranium is complete and partially disarticulated in chunks. The frontal, maxilla, sphenoid, nasals and left zygomatic remain articulated (with the rest of the smaller facial bones). The occipital and both parietals are still articulated as well. Some surface wear and flaking but bone integrity is intact. Minor suture pulling at left ASB, bregma, and maxillary palate.
LL522	Cranium is mostly complete. Frontal, maxilla, right temporal, and facial bones are still articulated. All bones are in good condition except the occiptal, which is highly worn and missing the posterior end. Minimal surface wear on all other cranial bones.
LL600	Skull is complete but significantly disarticulated. The frontal, maxillae, sphenoid, facial bones, and left zygomatic remain fused, as well as the occipital and right parietal. The left parietal, occipital, and left temporal are significantly damaged from extensive weathering, with extreme thinning and breakage. The remainder of the bones also show weather, but not to the same extent that inhibited measuring.
LL684	Complete and articulated. Minor surface wear on anterior half of skeleton, otherwise perfect condition. Very slight flaring of temporals. Superior half of occipital and posterior third of parietals more significantly worn, sutures pulling away from each other.
LL719	Cranium is complete and articulated. Surface wear and flaking primarily on all surfaces except the facial bones (zygomatics, maxillae, nasals). Right zygomatic arch is broken and bent. More extensive damage to base of skull, with occipital epicondyles and mastoid processes fairly worn. Prostheon is broken.
LL740	Complete and partially disarticulated. Frontal, xygomatics, maxillae, facial bones, sphenoid, and left zygomatic remain articulated together. Occipital and both parietals remain articulated together. PMD of inferior occipital, right parietal, left zygomatic that prohibit some measurements. Extensive weathering and flaking of bone surface.
HTH 0017	Skull is in decent shape but has been sawed down the sagittal plane and reattached using metal wire. ASB location is uncertain because of very complex sutures in that area. Prostheon, naseon, and lambda may be suspect. Mid-orbital sutures are unclear.
HTH 0098	Cranial vault has been removed and is missing. Horizontal cut from just above superciliary arch, around top of temporals, and just below lambda. Also, strange holes that enlarge the meatus, making measurement of mastoids impossible.
HTH 0233	Skull is quartered and then reattached with metal wires.MOW is unclear.
HTH 0404	Skull has been cut with 1mm saw from mid-frontal to the temporal and across the superior aspect of the occipital. Large ossicles. No other PMD to note. Skull is in good condition.
HTH 0485	Cranium is in excellent condition, except for being sawed in half along the sagittal plane.
HTH 0526	Cranium was sawed in half along sagittal plane, only right half is present, but in good condition. Location of bregma estimated because of absence of other hemisphere.
HTH 0527	Cranium is in fairly good condition, although sawed in half down the sagittal plane. The location of ASB is unclear because of near obliteration of part of the sutures in that area.
HTH 0576	Skull has been sawed down the sagittal plane and reattached with metal wire that doesn't allow some measurements. In addition, the right half of the face is broken off (except for the zygomatic). The right maxilla is present but disarticulated. The left maxilla's prostheon is broken off. Nasion is suspect. Right dacryon was approximated.
HTH 0624	Cranium is in five pieces: right parietal cut along sagittal suture; left parietal cut along sagittal suture; right half of occipital cut along sagittal; left half of sagittal cut along sagittal; right half of frontal, zygomatic, maxilla, sphenoid articulated together but cut down sagittal suture.
HTH 0632	Cranium is in four pieces: the right maxilla, zygomatic, temporal, and half of frontal are intact (sawed in half along sagittal plane), the right parietal is intact and in good condition (although cut along sagittal suture), and the occipital is present, but has been cut into two hemispheres. These halves have experienced some bending PM and no longer line up exactly. The left half was used for measurements since the right half appears to be abnormally curved. In addition, prostheon and orbital wing of sphenoid have been broken PM.
HTH 0633	Cranium is in exellent condition, although only the right side is present after being sawed down the sagittal plane. Bregma and lambda are assumed because of this.
HTH 0645	Cranium is in excellent condition. No wear or PMD except for it has been sawed in two halves along the sagittal plane.
HTH 0695	Cranium is in decent condition except for that it has been sawed in half PM down the sagittal plane and reattached with metal wire that doesn't allow for some measurements. In addition, the sutures at ASB are too obliterated for measurement. Nasal bones have been broken off.
HTH 0710	Cranium shows little wear, but has been significantly cut apart PM into the following pieces: the occipital and right and left temporals are intact. The frontal has been cut laterally just above the glabellar region, but remains attached to the rest of the face. The superior section of the frontal is also present. Segments of the right and left parietal are present, but have been sawed in half.
HTH 0721	Cranium is a good condition but has been sawed in half along the sagittal plane and reattached with metal wire. The wire makes some measurements impossible. In addition, it leaves a 2-3mm gap in the facial area, so bilateral facial measurements were not done.
HTH 0872	Cranium is in excellent condition, except for significant tooth breakage. The craniual vault has been removed PM from the rest of the cranium.
HTH 1012	Cranium is in good condition, but has been sawed in half along the sagittal plane. The halves have been reattached using wire that sticks out from the surface and makes some measurements impossible along the sagittal suture line. In addition, the facial elements of the skull have a large (4-5mm) gap that cannot be closed, so bilateral facial measurements were not taken.

Specimen ID	Description
HTH 1041	Cranium is in reasonably good condition, although most of the teeth have been broken off PM. The skull has been sawed in half along the sagittal plane and then reattached with large metal wires. These wires make some measurements along the sagittal plane impossible. Small rectangle (25x10mm) has been removed from the right parietal boss, but did not impede measurements.
HTH 1074	Skull appears abnormally large for age, but with typical age-appropriate features (postcranially, the age seems fine). Metopic suture is unfused. Skull has been sawed in half PM along sagittal suture with 1mm saw. Good condition, PMD on inferior aspect of right occipital, some surface wear on left temporal and left maxilla.
HTH 1097	Cranium is in good condition except that it has been sawed in half down the sagittal plane and reattached with metal wire. Hole (blunt force trauma) in left temporal that does not affect measurements. Also a antemortem break at zygofrontal suture.
HTH 1098	Skull is in good condition - very thick and sturdy. The skull has been sawed in half along the sagittal suture postmortem. Width of saw appears to be approximately 1mm. Some slight PMD on left zygomatic arch. Linear scraping on exterior and interior surfaces of cranium - possibly from cleaning?
HTH 1115	Condition of skull was not recorded.
HTH 1156	Cranium is in good condition except for the right half and the anterior section of the occiptal are missing.
HTH 1168	Cranium is in poor condition - bone is thin, porous, and has a lot of wear and damage because of it. The right and left parietals are still present, but the right parietal is bent and damaged. The face and frontal bones are articulated but in two halves because of nonclosure of the metopic suture. Eye orbits have some weathering. Prostheon, bregma, are absent, as is dacryon. I estimated dacryon for this specimen. All measurements may not be fully accurate.
HTH 1228	Cranium is in excellent condition except that it has been sawed in half down the sagittal plane. The halves have been reattached using wire that sticks out from the surface and makes some measurements along the sagittal plane impossible.
HTH 1232	Cranium is in excellent condition except that it has been sawed in half down the sagittal plane.
HTH 1240	Cranium is in a total of 5 pieces: the disarticulated left temporal; the disarticulated and cut (along the sagittal suture) left parietal; the left half of the frontal (cut along the sagittal suture) articulated with the left maxilla, left nasal, left zygomatic, and left half of sphenoid; the left half of the occipital (cut along the sagittal suture with some PM damage to the left lateral border; and the right half of the cranium, cut along the sagittal suture, that is still intact and articulated. Some surface wear on this specimen and the bones feel lighter than others in this collection.
HTH 1385	Facial bones are broken off, but cranial vault is still in reasonably good condition. Right half of occipital is missing, inferior portion of left occipital is missing. Maxillae are in poor condition and separate.
HTH 1435	Cranial vault is extremely disfigured. Facial bones do not appear to have shifted much, but if measurements prove to be atypical for age, specimen should be thrown out.
HTH 1441	Cranium is broken cut into several pieces (as well as disarticulation along joints. Both parietals remain very loosely attached to one another (with the help of tape), but have been cut along the inferior aspects. The frontal has also been cut along the frontal bossing, but the inferior half of the frontal remains articulated to the facial bones. The posterior/superior aspect of the frontal is present, but disarticulated. The occipital is intact except for the very superior region has been sawed off (about an inch) and remains articlated to the parietals. Both temporals are present and intact, although disarticulated. Dacryon is set VERY far back and there is a slight persistence of the metopic suture (approximately 15mm) at glabella.
HTH 1557	Skull is cut in half (sagittal plane) and then partially disarticulated but intact except for basilar portion of occipital, which appears to have not fused yet. Location of nasion unclear, possibly an additional 4mm to the inferior of where I was measuring (nasal bones do not reach all the way to the frontal, leaving two horizontal lines.
HTH 1688	Cranium is sawed in half along sagittal plane but otherwise in good condition.
HTH 1772	Cranium has been sawed in half along sagittal plane. Left side is in good condition, right side is missing portions of the facial bones. Zygomatic is still intact. Exact position of right dacryon is assumed.
HTH 1784	Only the left half of the skull is present, sawed down the middle. Bregma, lambda, and prostheon were all assumed because of this. Inferior portion of the occiptal is missing (along with basion). Otherwise good condition.
HTH 1834	Cranium is in perfect condition except for it is sawed in half along the sagittal suture.
HTH 1894	Mostly disarticulated except for the facial bones and frontal. Parietals have been cut (2x) and frontal is cut horizontally.
HTH 1950	Cranium is in poor condition. The vault has been removed from the rest of the cranium, making some measurements impossible. In addition, all of the facial bones (to include the zygomatic) on the right side are absent. They are present on the left side, however, the maxilla is damaged.
HTH 2036	Cranium has been sawed in half along sagittal plane. The right half of the cranium, minus the occipital, is intact and articulated together. The left half of the occipital is also present and unarticulated. Prostheon is unobservable due to PMD. Location of both lambda and bregma were assumed (bregma likely very accurate, lambda less certain).
HTH 2074	Cranium has been sawed in half along sagittal plane. Because of open sutures, the occipital bone has started to pull away from the rest of the cranium. Because of this, lateral measurements that require the two halves to be put together should be thrown out if they are atypical.

Specimen ID	Description
HTH 2075	Highly disarticulated, also cut down the sagittal plane. Left occipital condyle is broken off. Bregma estimated. Nasion higher on one side than the other - I used the higher side in measurements.
HTH 2104	Good condition, but skull is sawed in half along sagittal plane. It is reattached with wire (making some measurements impossible), leaving a 2mm gap along the sagittal plane. If bilateral measurements are off, this could be why. Also, dacryon is set VERY low and deep inside the eye orbit - very atypical.
HTH 2118	Excellent condition, although skull is sawed in half along the sagittal plane.
HTH 2135	Cranium is in excellent condition except that it has been sawed in half down the sagittal plane.
HTH 2144	Cranial vault has been removed by saw in one piece. The rest of the cranium is disarticulated, except the inferior segment of the frontal is still articulated to the rest of the facial bones and zygomatics. Metopic suture is still present and frontal is disarticulated along it.
HTH 2310	Cranium is in decent condition, with some minor wear. The cranial vault has been removed from the rest of the skull and does not fit nicely back into place, making some measurements impossible to get with any accuracy.
HTH 2370	Highly disarticulated, also the cranial vault has been removed along the parietals and frontal. Inferior portion of occipital missing. Nasion estimated.
HTH 2714	Cranium is highly disarticulated and has been sawed in half down the sagittal plane (slightly to the right). The right half of the frontal remains articulated to the right facial bones and zygomatic. The right parietal is not articulated to anything else but is missing the medial border. The left half of the frontal, parietal, and most of the occipital (missing the anterior border, broken PM) are articulated together. The temporals are by themselves. Other facial bones are highly fragmentary and in a bag. Metopic suture is mostly fused except for a 8mm fontanelle - bregma was estimated because of this.
HTH 3112	Cranium is in good condition except for the cranial vault has been removed. It has been replaced with clasps and seems to fit well, so all vault measurements were performed. Location of ASB is unclear due to many small ossicles and slight suture obliteration.

Appendix 4: Plots of Juvenile Cranial Measurement Values vs. Age. The individual measurements graphed against age. The equation and R^2 values are in the bottom right corner.

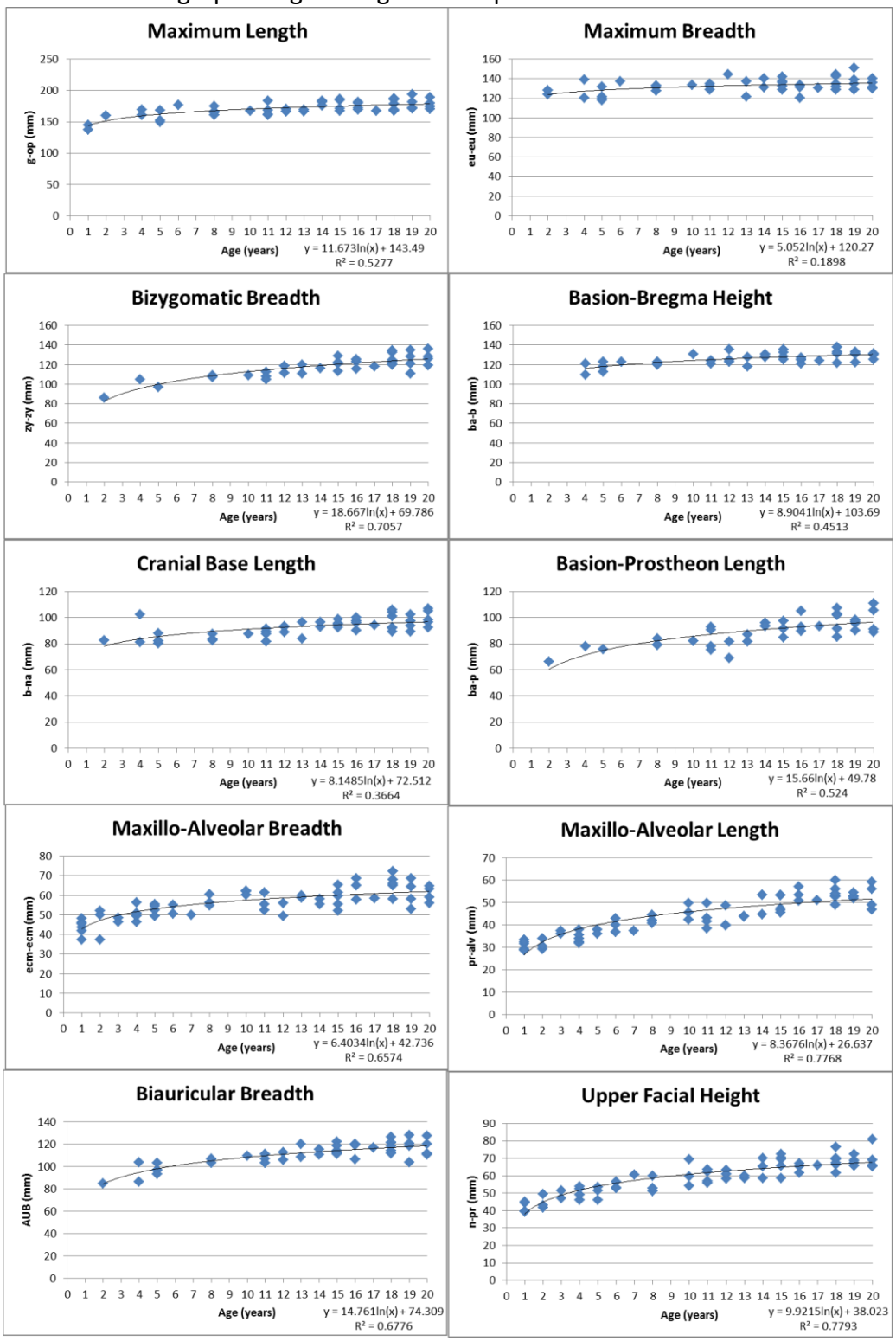

Figure 5: Plots of Measurements Against Age for Maximum Length, Maximum Breadth, Byzygomatic Breadth, Basion-Bregma Height, Cranial Base Length, Basion-Prostheon Length, Maxillo-Alveolar Breadth, Maxillo-Alveolar Length, Biauricular Breadth, and Upper Facial Height.

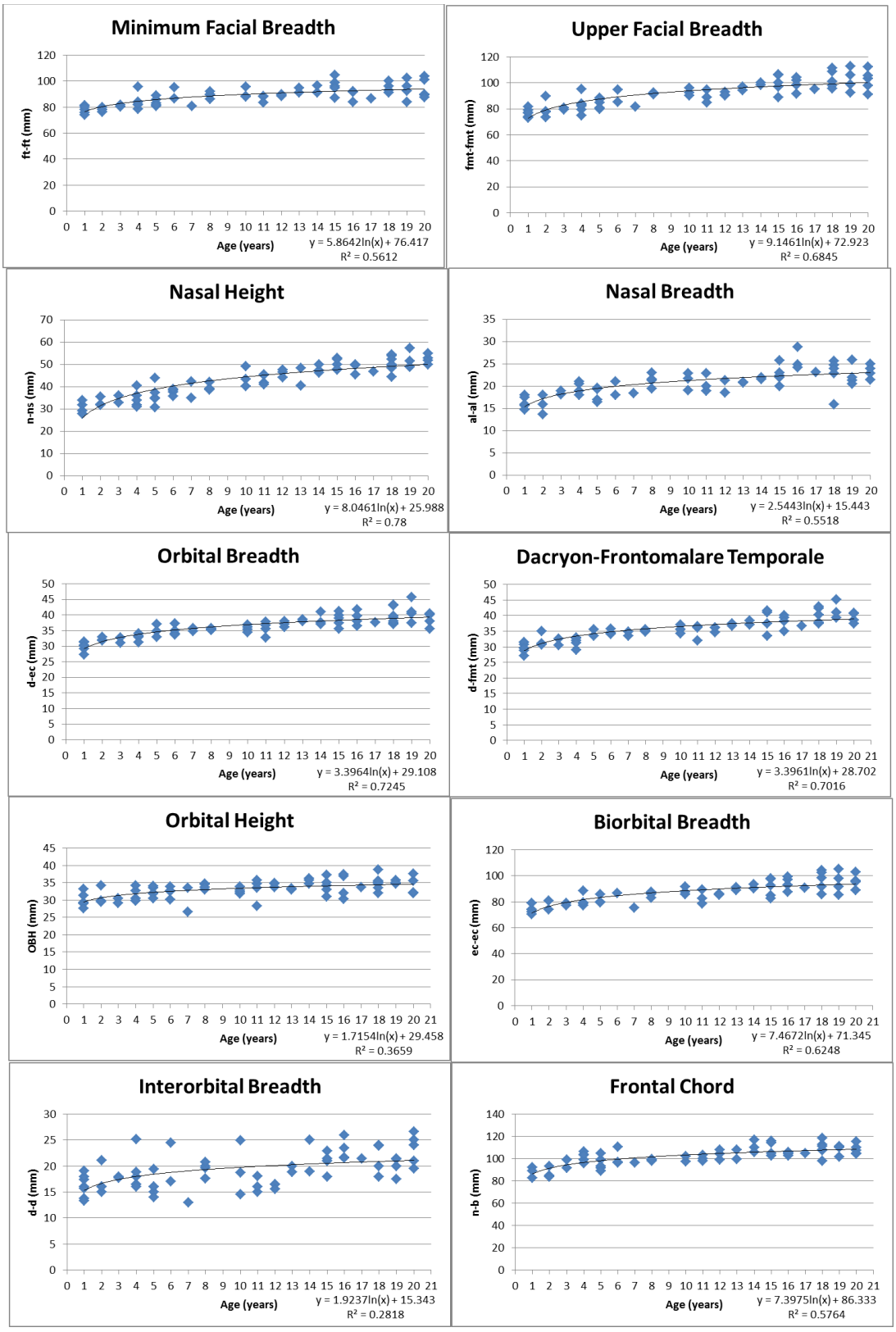

Figure 6: Plots of Measurements Against Age for Minimum Facial Breadth, Upper Facial Breadth, Nasal Height, Nasal Breadth, Orbital Breadth, Dacryon-Frontomalare Temporale, Orbital Height, Biorbital Breadth, Interorbital Breadth, and Frontal Chord.

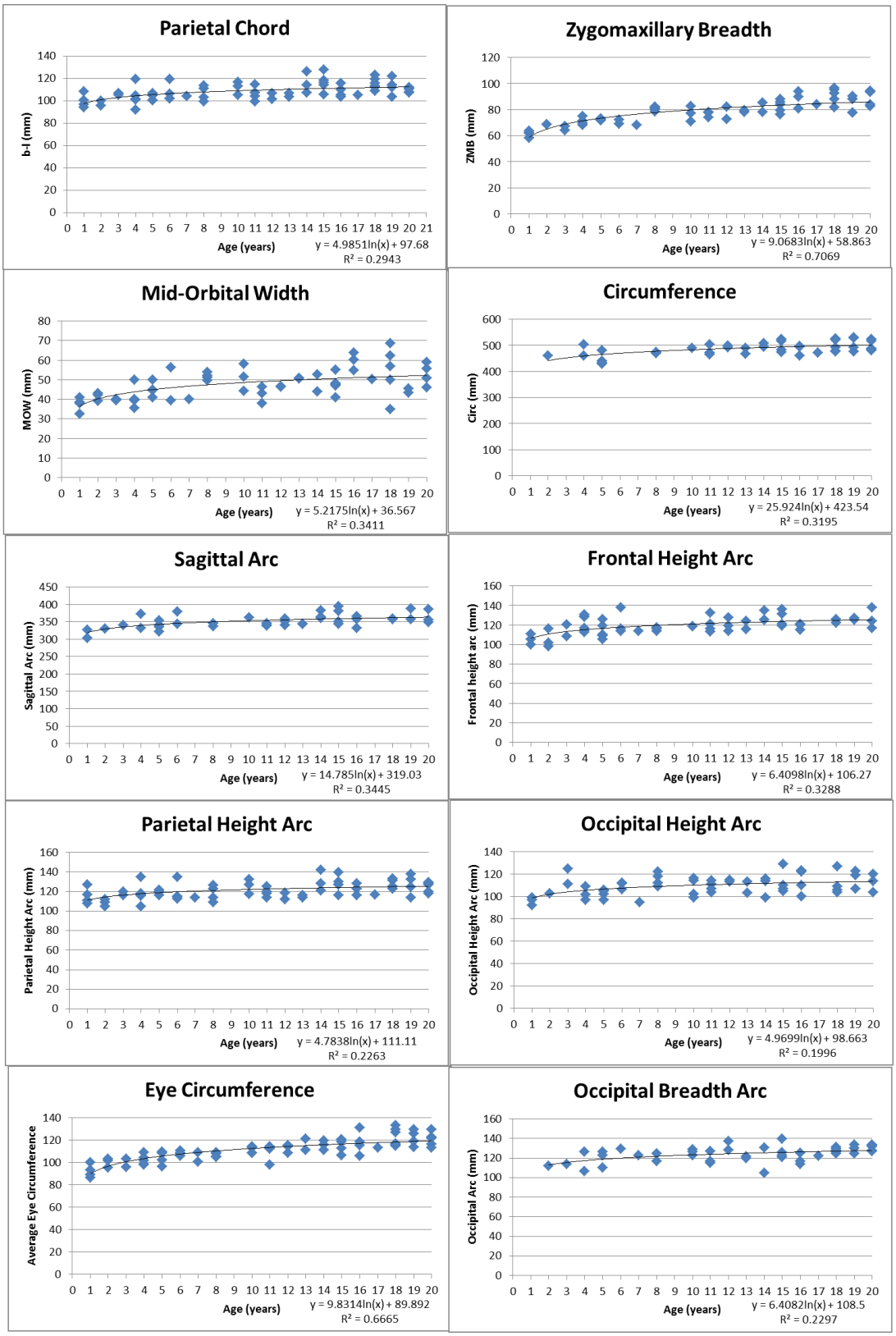

Figure 7: Plots of Measurements Against Age for Parietal Chord, Zygomaxillary Breadth, Mid-Orbital Width, Circumference, Sagittal Arc, Frontal Height Arc, Parietal Height Arc, Occipital Height Arc, Eye Circumference, and Occipital Breadth Arc.

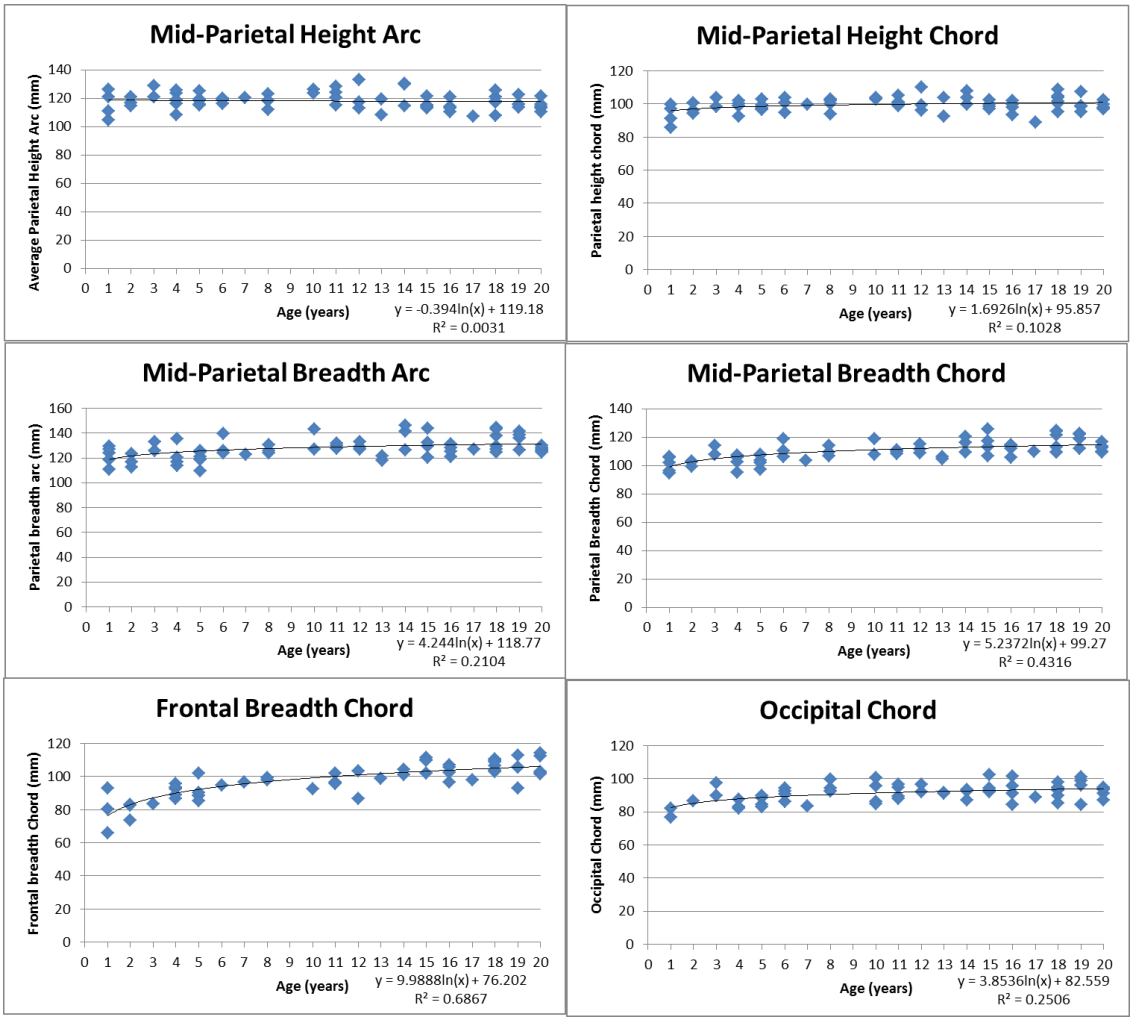

Figure 8: Plots of Measurements Against Age for Mid-Parietal Height Arc, Mid-Parietal Height Chord, Mid-Parietal Breadth Arc, Mid-Parietal Chord, Frontal Breadth Chord, and Occipital Chord.

Appendix 5: Correlations between Variables with Significances. The SPSS output of each of the raw measurements in relation to the other measurements, including their correlation, significance, and degrees of freedom. Age is the dependent variable.

Table 6: Correlations between Variables with Significances. The SPSS output of each of the raw measurements in relation to the other measurements, including their correlation, significance, and degrees of freedom. Age is the dependent variable in all cases.

		gop	eueu	zyzy	bab	ban	bapr	ecmecm	pralv	AUB	npr	ftft	fmtfmt	nns	alal	decleft	decright	decavg
Gop	Correlation	1.000	.607	.560	.285	.721	.698	.198	.531	.531	.701	.626	.557	.799	.433	.420	.509	.480
	Significance		.016	.030	.304	.002	.004	.480	.042	.041	.004	.013	.031	.000	.107	.119	.052	.070
	df	0	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Eueu	Correlation	.607	1.000	.409	.661	.532	.381	.051	.353	.470	.668	.250	.396	.821	.000	.212	.201	.216
	Significance	.016		.130	.007	.041	.161	.858	.197	.077	.006	.370	.144	.000	.999	.449	.472	.440
	df	13	0	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Zyzy	Correlation	.560	.409	1.000	.149	.593	.651	.741	.528	.919	.663	.894	.546	.592	.652	.639	.451	.577
	Significance	.030	.130		.596	.020	.009	.002	.043	.000	.007	.000	.035	.020	.008	.010	.092	.024
	df	13	13	0	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Bab	Correlation	.285	.661	.149	1.000	.446	.248	.036	.236	.179	.370	-.106	.293	.422	-.133	-.033	.014	-.012
	Significance	.304	.007	.596		.096	.373	.898	.397	.523	.175	.706	.289	.118	.635	.906	.961	.965
	df	13	13	13	0	13	13	13	13	13	13	13	13	13	13	13	13	13
Ban	Correlation	.721	.532	.593	.446	1.000	.808	.199	.618	.499	.438	.508	.359	.709	.559	.367	.271	.337
	Significance	.002	.041	.020	.096		.000	.476	.014	.058	.103	.053	.188	.003	.030	.179	.328	.219
	df	13	13	13	13	0	13	13	13	13	13	13	13	13	13	13	13	13
Bapr	Correlation	.698	.381	.651	.248	.808	1.000	.510	.925	.520	.363	.701	.224	.574	.709	.391	.256	.343
	Significance	.004	.161	.009	.373	.000		.052	.000	.047	.183	.004	.422	.025	.003	.150	.358	.211
	df	13	13	13	13	13	0	13	13	13	13	13	13	13	13	13	13	13
Ecmecm	Correlation	.198	.051	.741	.036	.199	.510	1.000	.544	.650	.256	.637	.241	.234	.675	.524	.376	.476
	Significance	.480	.858	.002	.898	.476	.052		.036	.009	.357	.011	.387	.401	.006	.045	.167	.073
	df	13	13	13	13	13	13	0	13	13	13	13	13	13	13	13	13	13
Pralv	Correlation	.531	.353	.528	.236	.618	.925	.544	1.000	.414	.292	.597	.150	.440	.590	.370	.258	.333
	Significance	.042	.197	.043	.397	.014	.000	.036		.125	.291	.019	.593	.101	.021	.174	.353	.226
	df	13	13	13	13	13	13	13	0	13	13	13	13	13	13	13	13	13
AUB	Correlation	.531	.470	.919	.179	.499	.520	.650	.414	1.000	.611	.807	.469	.674	.415	.674	.549	.643
	Significance	.041	.077	.000	.523	.058	.047	.009	.125		.016	.000	.078	.006	.124	.006	.034	.010
	df	13	13	13	13	13	13	13	13	0	13	13	13	13	13	13	13	13
Npr	Correlation	.701	.668	.663	.370	.438	.363	.256	.292	.611	1.000	.589	.758	.613	.237	.482	.461	.492
	Significance	.004	.006	.007	.175	.103	.183	.357	.291	.016		.021	.001	.015	.396	.069	.084	.062
	df	13	13	13	13	13	13	13	13	13	0	13	13	13	13	13	13	13
Ftft	Correlation	.626	.250	.894	-.106	.508	.701	.637	.597	.807	.589	1.000	.417	.451	.641	.679	.495	.621
	Significance	.013	.370	.000	.706	.053	.004	.011	.019	.000	.021		.122	.092	.010	.005	.061	.014
	df	13	13	13	13	13	13	13	13	13	13	0	13	13	13	13	13	13
Fmtfmt	Correlation	.557	.396	.546	.293	.359	.224	.241	.150	.469	.758	.417	1.000	.485	.177	.327	.519	.432
	Significance	.031	.144	.035	.289	.188	.422	.387	.593	.078	.001	.122		.067	.529	.234	.047	.108
	df	13	13	13	13	13	13	13	13	13	13	13	0	13	13	13	13	13
Nns	Correlation	.799	.821	.592	.422	.709	.574	.234	.440	.674	.613	.451	.485	1.000	.316	.376	.433	.419
	Significance	.000	.000	.020	.118	.003	.025	.401	.101	.006	.015	.092	.067		.251	.167	.107	.120
	df	13	13	13	13	13	13	13	13	13	13	13	13	0	13	13	13	13
Alal	Correlation	.433	.000	.652	-.133	.559	.709	.675	.590	.415	.237	.641	.177	.316	1.000	.427	.255	.364
	Significance	.107	.999	.008	.635	.030	.003	.006	.021	.124	.396	.010	.529	.251		.113	.358	.183
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	0	13	13	13
Decleft	Correlation	.420	.212	.639	-.033	.367	.391	.524	.370	.674	.482	.679	.327	.376	.427	1.000	.839	.966
	Significance	.119	.449	.010	.906	.179	.150	.045	.174	.006	.069	.005	.234	.167	.113		.000	.000
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	0	13	13
Decright	Correlation	.509	.201	.451	.014	.271	.256	.376	.258	.549	.461	.495	.519	.433	.255	.839	1.000	.951
	Significance	.052	.472	.092	.961	.328	.358	.167	.353	.034	.084	.061	.047	.107	.358	.000		.000
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	0	13

		gop	eueu	zyzy	bab	ban	bapr	ecmecm	pralv	AUB	npr	ftft	fmtfmt	nns	alal	decleft	decright	decavg
Decavg	Correlation	.480	.216	.577	-.012	.337	.343	.476	.333	.643	.492	.621	.432	.419	.364	.966	.951	1.000
	Significance	.070	.440	.024	.965	.219	.211	.073	.226	.010	.062	.014	.108	.120	.183	.000	.000	
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	0
Dfmtleft	Correlation	.455	.144	.666	.010	.402	.414	.498	.340	.645	.464	.744	.427	.299	.452	.907	.800	.894
	Significance	.089	.607	.007	.971	.137	.125	.059	.216	.009	.081	.001	.113	.280	.091	.000	.000	.000
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Dfmtright	Correlation	.499	.103	.542	.013	.256	.299	.428	.238	.526	.544	.639	.556	.251	.319	.857	.854	.891
	Significance	.058	.714	.037	.965	.358	.280	.112	.393	.044	.036	.010	.031	.368	.247	.000	.000	.000
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
dfmtavg	Correlation	.488	.126	.615	.012	.334	.362	.472	.294	.596	.516	.705	.504	.280	.392	.900	.845	.912
	Significance	.065	.655	.015	.967	.224	.185	.076	.288	.019	.049	.003	.056	.312	.149	.000	.000	.000
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
OBHleft	Correlation	.392	.235	.339	-.032	.150	.179	.170	.163	.336	.449	.499	.338	.179	.053	.724	.563	.678
	Significance	.149	.399	.216	.910	.593	.523	.545	.563	.221	.093	.059	.217	.522	.850	.002	.029	.005
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
OBHright	Correlation	.173	.067	.147	-.115	-.004	-.019	.018	.032	.189	.324	.291	.335	.026	-.119	.682	.584	.664
	Significance	.538	.811	.602	.682	.989	.946	.950	.909	.501	.239	.293	.223	.927	.674	.005	.022	.007
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
OBHavg	Correlation	.293	.158	.252	-.074	.078	.086	.099	.102	.271	.398	.408	.344	.108	-.030	.720	.586	.687
	Significance	.289	.574	.364	.794	.782	.761	.725	.717	.328	.142	.131	.209	.702	.916	.002	.022	.005
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
ecec	Correlation	.637	.173	.842	-.003	.612	.817	.699	.716	.658	.517	.920	.467	.398	.787	.643	.485	.596
	Significance	.011	.538	.000	.991	.015	.000	.004	.003	.008	.048	.000	.079	.142	.001	.010	.067	.019
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
dd	Correlation	.558	.183	.705	-.182	.524	.753	.515	.626	.478	.420	.801	.301	.372	.734	.378	.116	.270
	Significance	.031	.514	.003	.517	.045	.001	.050	.013	.071	.119	.000	.275	.173	.002	.165	.680	.331
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
nb	Correlation	.667	.775	.319	.554	.596	.474	-.079	.416	.225	.689	.293	.439	.558	.051	.177	.121	.158
	Significance	.007	.001	.247	.032	.019	.074	.781	.123	.420	.004	.290	.101	.031	.856	.529	.667	.574
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
bl	Correlation	.799	.512	.609	.409	.572	.705	.437	.574	.652	.491	.606	.478	.721	.321	.291	.385	.348
	Significance	.000	.051	.016	.130	.026	.003	.103	.025	.008	.063	.017	.071	.002	.243	.292	.157	.204
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
lo	Correlation	.301	.213	.065	.424	.155	.117	.304	.157	.201	.199	-.078	.155	.357	.140	.273	.463	.375
	Significance	.276	.446	.817	.115	.582	.678	.271	.576	.472	.476	.783	.582	.191	.618	.325	.082	.168
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
bao	Correlation	.422	.335	.006	.574	.253	.159	-.138	.039	-.047	.252	-.030	.458	.252	-.130	-.196	.081	-.073
	Significance	.117	.223	.983	.025	.364	.571	.624	.889	.867	.365	.917	.086	.364	.643	.484	.773	.797
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
FOB	Correlation	.199	.344	-.087	.265	.275	-.034	-.407	-.157	.043	.131	-.209	.224	.449	-.212	.069	.200	.134
	Significance	.477	.209	.757	.339	.321	.905	.132	.575	.879	.642	.455	.422	.093	.449	.806	.475	.633
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
ASB	Correlation	-.384	-.479	-.326	-.516	-.539	-.442	-.086	-.405	-.258	-.542	-.130	-.364	-.461	-.174	-.065	-.008	-.041
	Significance	.157	.071	.236	.049	.038	.099	.761	.135	.353	.037	.644	.182	.084	.535	.817	.977	.885
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
ZMB	Correlation	.103	-.025	.700	-.098	.285	.536	.793	.512	.521	.247	.575	.184	.193	.777	.346	.077	.233
	Significance	.714	.928	.004	.729	.303	.040	.000	.051	.046	.375	.025	.512	.491	.001	.206	.784	.402
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
MOW	Correlation	.395	-.113	.637	-.266	.386	.676	.749	.589	.422	.207	.725	.113	.180	.918	.527	.291	.437
	Significance	.145	.687	.011	.337	.156	.006	.001	.021	.117	.458	.002	.689	.521	.000	.044	.293	.103
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Circ	Correlation	.931	.750	.641	.456	.678	.621	.335	.507	.618	.785	.599	.667	.841	.393	.493	.592	.561
	Significance	.000	.001	.010	.088	.005	.013	.222	.054	.014	.001	.018	.007	.000	.148	.062	.020	.030
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
SagittalArc	Correlation	.854	.710	.571	.567	.561	.508	.324	.428	.606	.832	.484	.675	.776	.255	.443	.563	.519
	Significance	.000	.003	.026	.028	.030	.053	.238	.111	.017	.000	.067	.006	.001	.360	.098	.029	.048
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
FroHArc	Correlation	.659	.752	.396	.491	.554	.385	-.002	.333	.273	.790	.328	.587	.552	.126	.243	.225	.245
	Significance	.008	.001	.144	.063	.032	.156	.994	.225	.326	.000	.232	.021	.033	.654	.383	.421	.380
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13

		gop	eueu	zyzy	bab	ban	bapr	ecmecm	pralv	AUB	npr	ftft	fmtfmt	nns	alal	decleft	decright	decavg
Decavg	Correlation	.480	.216	.577	-.012	.337	.343	.476	.333	.643	.492	.621	.432	.419	.364	.966	.951	1.000
	Significance	.070	.440	.024	.965	.219	.211	.073	.226	.010	.062	.014	.108	.120	.183	.000	.000	
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	0
Dfmtleft	Correlation	.455	.144	.666	.010	.402	.414	.498	.340	.645	.464	.744	.427	.299	.452	.907	.800	.894
	Significance	.089	.607	.007	.971	.137	.125	.059	.216	.009	.081	.001	.113	.280	.091	.000	.000	.000
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Dfmtright	Correlation	.499	.103	.542	.013	.256	.299	.428	.238	.526	.544	.639	.556	.251	.319	.857	.854	.891
	Significance	.058	.714	.037	.965	.358	.280	.112	.393	.044	.036	.010	.031	.368	.247	.000	.000	.000
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
dfmtavg	Correlation	.488	.126	.615	.012	.334	.362	.472	.294	.596	.516	.705	.504	.280	.392	.900	.845	.912
	Significance	.065	.655	.015	.967	.224	.185	.076	.288	.019	.049	.003	.056	.312	.149	.000	.000	.000
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
OBHleft	Correlation	.392	.235	.339	-.032	.150	.179	.170	.163	.336	.449	.499	.338	.179	.053	.724	.563	.678
	Significance	.149	.399	.216	.910	.593	.523	.545	.563	.221	.093	.059	.217	.522	.850	.002	.029	.005
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
OBHright	Correlation	.173	.067	.147	-.115	-.004	-.019	.018	.032	.189	.324	.291	.335	.026	-.119	.682	.584	.664
	Significance	.538	.811	.602	.682	.989	.946	.950	.909	.501	.239	.293	.223	.927	.674	.005	.022	.007
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
OBHavg	Correlation	.293	.158	.252	-.074	.078	.086	.099	.102	.271	.398	.408	.344	.108	-.030	.720	.586	.687
	Significance	.289	.574	.364	.794	.782	.761	.725	.717	.328	.142	.131	.209	.702	.916	.002	.022	.005
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
ecec	Correlation	.637	.173	.842	-.003	.612	.817	.699	.716	.658	.517	.920	.467	.398	.787	.643	.485	.596
	Significance	.011	.538	.000	.991	.015	.000	.004	.003	.008	.048	.000	.079	.142	.001	.010	.067	.019
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
dd	Correlation	.558	.183	.705	-.182	.524	.753	.515	.626	.478	.420	.801	.301	.372	.734	.378	.116	.270
	Significance	.031	.514	.003	.517	.045	.001	.050	.013	.071	.119	.000	.275	.173	.002	.165	.680	.331
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
nb	Correlation	.667	.775	.319	.554	.596	.474	-.079	.416	.225	.689	.293	.439	.558	.051	.177	.121	.158
	Significance	.007	.001	.247	.032	.019	.074	.781	.123	.420	.004	.290	.101	.031	.856	.529	.667	.574
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
bl	Correlation	.799	.512	.609	.409	.572	.705	.437	.574	.652	.491	.606	.478	.721	.321	.291	.385	.348
	Significance	.000	.051	.016	.130	.026	.003	.103	.025	.008	.063	.017	.071	.002	.243	.292	.157	.204
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
lo	Correlation	.301	.213	.065	.424	.155	.117	.304	.157	.201	.199	-.078	.155	.357	.140	.273	.463	.375
	Significance	.276	.446	.817	.115	.582	.678	.271	.576	.472	.476	.783	.582	.191	.618	.325	.082	.168
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
bao	Correlation	.422	.335	.006	.574	.253	.159	-.138	.039	-.047	.252	-.030	.458	.252	-.130	-.196	.081	-.073
	Significance	.117	.223	.983	.025	.364	.571	.624	.889	.867	.365	.917	.086	.364	.643	.484	.773	.797
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
FOB	Correlation	.199	.344	-.087	.265	.275	-.034	-.407	-.157	.043	.131	-.209	.224	.449	-.212	.069	.200	.134
	Significance	.477	.209	.757	.339	.321	.905	.132	.575	.879	.642	.455	.422	.093	.449	.806	.475	.633
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
ASB	Correlation	-.384	-.479	-.326	-.516	-.539	-.442	-.086	-.405	-.258	-.542	-.130	-.364	-.461	-.174	-.065	-.008	-.041
	Significance	.157	.071	.236	.049	.038	.099	.761	.135	.353	.037	.644	.182	.084	.535	.817	.977	.885
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
ZMB	Correlation	.103	-.025	.700	-.098	.285	.536	.793	.512	.521	.247	.575	.184	.193	.777	.346	.077	.233
	Significance	.714	.928	.004	.729	.303	.040	.000	.051	.046	.375	.025	.512	.491	.001	.206	.784	.402
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
MOW	Correlation	.395	-.113	.637	-.266	.386	.676	.749	.589	.422	.207	.725	.113	.180	.918	.527	.291	.437
	Significance	.145	.687	.011	.337	.156	.006	.001	.021	.117	.458	.002	.689	.521	.000	.044	.293	.103
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Circ	Correlation	.931	.750	.641	.456	.678	.621	.335	.507	.618	.785	.599	.667	.841	.393	.493	.592	.561
	Significance	.000	.001	.010	.088	.005	.013	.222	.054	.014	.001	.018	.007	.000	.148	.062	.020	.030
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
SagittalArc	Correlation	.854	.710	.571	.567	.561	.508	.324	.428	.606	.832	.484	.675	.776	.255	.443	.563	.519
	Significance	.000	.003	.026	.028	.030	.053	.238	.111	.017	.000	.067	.006	.001	.360	.098	.029	.048
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
FroHArc	Correlation	.659	.752	.396	.491	.554	.385	-.002	.333	.273	.790	.328	.587	.552	.126	.243	.225	.245
	Significance	.008	.001	.144	.063	.032	.156	.994	.225	.326	.000	.232	.021	.033	.654	.383	.421	.380
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13

Control Variables			dfmtleft	dfmtright	dfmtavg	OBHleft	OBHright	OBHavg	ecec	dd	nb	bl	lo	bao	FOB	ASB	ZMB	MOW	Circ
Age	gop	Correlation	.455	.499	.488	.392	.173	.293	.637	.558	.667	.799	.301	.422	.199	-.384	.103	.395	.931
		Significance	.089	.058	.065	.149	.538	.289	.011	.031	.007	.000	.276	.117	.477	.157	.714	.145	.000
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	eueu	Correlation	.144	.103	.126	.235	.067	.158	.173	.183	.775	.512	.213	.335	.344	-.479	-.025	-.113	.750
		Significance	.607	.714	.655	.399	.811	.574	.538	.514	.001	.051	.446	.223	.209	.071	.928	.687	.001
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	zyzy	Correlation	.666	.542	.615	.339	.147	.252	.842	.705	.319	.609	.065	.006	-.087	-.326	.700	.637	.641
		Significance	.007	.037	.015	.216	.602	.364	.000	.003	.247	.016	.817	.983	.757	.236	.004	.011	.010
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	bab	Correlation	.010	.013	.012	-.032	-.115	-.074	-.003	-.182	.554	.409	.424	.574	.265	-.516	-.098	-.266	.456
		Significance	.971	.965	.967	.910	.682	.794	.991	.517	.032	.130	.115	.025	.339	.049	.729	.337	.088
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ban	Correlation	.402	.256	.334	.150	-.004	.078	.612	.524	.596	.572	.155	.253	.275	-.539	.285	.386	.678
		Significance	.137	.358	.224	.593	.989	.782	.015	.045	.019	.026	.582	.364	.321	.038	.303	.156	.005
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	bapr	Correlation	.414	.299	.362	.179	-.019	.086	.817	.753	.474	.705	.117	.159	-.034	-.442	.536	.676	.621
		Significance	.125	.280	.185	.523	.946	.761	.000	.001	.074	.003	.678	.571	.905	.099	.040	.006	.013
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ecmecm	Correlation	.498	.428	.472	.170	.018	.099	.699	.515	-.079	.437	.304	-.138	-.407	-.086	.793	.749	.335
		Significance	.059	.112	.076	.545	.950	.725	.004	.050	.781	.103	.271	.624	.132	.761	.000	.001	.222
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	pralv	Correlation	.340	.238	.294	.163	.032	.102	.716	.626	.416	.574	.157	.039	-.157	-.405	.512	.589	.507
		Significance	.216	.393	.288	.563	.909	.717	.003	.013	.123	.025	.576	.889	.575	.135	.051	.021	.054
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	AUB	Correlation	.645	.526	.596	.336	.189	.271	.658	.478	.225	.652	.201	-.047	.043	-.258	.521	.422	.618
		Significance	.009	.044	.019	.221	.501	.328	.008	.071	.420	.008	.472	.867	.879	.353	.046	.117	.014
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	npr	Correlation	.464	.544	.516	.449	.324	.398	.517	.420	.689	.491	.199	.252	.131	-.542	.247	.207	.785
		Significance	.081	.036	.049	.093	.239	.142	.048	.119	.004	.063	.476	.365	.642	.037	.375	.458	.001
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ftft	Correlation	.744	.639	.705	.499	.291	.408	.920	.801	.293	.606	-.078	-.030	-.209	-.130	.575	.725	.599
		Significance	.001	.010	.003	.059	.293	.131	.000	.000	.290	.017	.783	.917	.455	.644	.025	.002	.018
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	fmtfmt	Correlation	.427	.556	.504	.338	.335	.344	.467	.301	.439	.478	.155	.458	.224	-.364	.184	.113	.667
		Significance	.113	.031	.056	.217	.223	.209	.079	.275	.101	.071	.582	.086	.422	.182	.512	.689	.007
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	nns	Correlation	.299	.251	.280	.179	.026	.108	.398	.372	.558	.721	.357	.252	.449	-.461	.193	.180	.841
		Significance	.280	.368	.312	.522	.927	.702	.142	.173	.031	.002	.191	.364	.093	.084	.491	.521	.000
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	alal	Correlation	.452	.319	.392	.053	-.119	-.030	.787	.734	.051	.321	.140	-.130	-.212	-.174	.777	.918	.393
		Significance	.091	.247	.149	.850	.674	.916	.001	.002	.856	.243	.618	.643	.449	.535	.001	.000	.148
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	decleft	Correlation	.907	.857	.900	.724	.682	.720	.643	.378	.177	.291	.273	-.196	.069	-.065	.346	.527	.493
		Significance	.000	.000	.000	.002	.005	.002	.010	.165	.529	.292	.325	.484	.806	.817	.206	.044	.062
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	decright	Correlation	.800	.854	.845	.563	.584	.586	.485	.116	.121	.385	.463	.081	.200	-.008	.077	.291	.592
		Significance	.000	.000	.000	.029	.022	.022	.067	.680	.667	.157	.082	.773	.475	.977	.784	.293	.020
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	decavg	Correlation	.894	.891	.912	.678	.664	.687	.596	.270	.158	.348	.375	-.073	.134	-.041	.233	.437	.561
		Significance	.000	.000	.000	.005	.007	.005	.019	.331	.574	.204	.168	.797	.633	.885	.402	.103	.030
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	dfmtleft	Correlation	1.000	.917	.978	.724	.642	.700	.735	.407	.143	.380	.136	.059	.024	.109	.297	.535	.521
		Significance		.000	.000	.002	.010	.004	.002	.132	.610	.163	.630	.834	.931	.700	.282	.040	.046
		df	0	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	dfmtright	Correlation	.917	1.000	.980	.788	.734	.779	.666	.353	.214	.412	.221	.209	.083	.018	.188	.464	.553
		Significance	.000		.000	.000	.002	.001	.007	.197	.443	.127	.429	.455	.768	.950	.502	.082	.032
		df	13	0	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	dfmtavg	Correlation	.978	.980	1.000	.773	.704	.757	.715	.387	.184	.405	.183	.139	.056	.063	.246	.509	.549
		Significance	.000	.000		.001	.003	.001	.003	.154	.512	.135	.513	.620	.843	.823	.377	.053	.034
		df	13	13	0	13	13	13	13	13	13	13	13	13	13	13	13	13	13

Control Variables			dfmtleft	dfmtright	dfmtavg	OBHleft	OBHright	OBHavg	ecec	dd	nb	bl	lo	bao	FOB	ASB	ZMB	MOW	Circ
Age	OBHleft	Correlation	0.724	0.788	0.773	1	0.912	0.979	0.467	0.382	0.394	0.245	-0.039	0.073	0.012	0.132	-0.049	0.298	0.432
		Significance	0.002	0	0.001		0	0	0.08	0.16	0.146	0.379	0.889	0.796	0.966	0.64	0.864	0.28	0.108
		df	13	13	13	0	13	13	13	13	13	13	13	13	13	13	13	13	13
	OBHright	Correlation	0.642	0.734	0.704	0.912	1	0.976	0.27	0.161	0.207	0.024	-0.035	-0.054	0.158	0.136	-0.112	0.105	0.205
		Significance	0.01	0.002	0.003	0		0	0.331	0.567	0.458	0.932	0.902	0.85	0.574	0.629	0.691	0.709	0.463
		df	13	13	13	13	0	13	13	13	13	13	13	13	13	13	13	13	13
	OBHavg	Correlation	0.7	0.779	0.757	0.979	0.976	1	0.38	0.282	0.312	0.142	-0.038	0.013	0.084	0.137	-0.081	0.21	0.33
		Significance	0.004	0.001	0.001	0	0		0.162	0.308	0.258	0.614	0.893	0.965	0.766	0.627	0.774	0.452	0.229
		df	13	13	13	13	13	0	13	13	13	13	13	13	13	13	13	13	13
	ecec	Correlation	0.735	0.666	0.715	0.467	0.27	0.38	1	0.854	0.332	0.617	0.004	0.114	-0.196	-0.218	0.649	0.846	0.616
		Significance	0.002	0.007	0.003	0.08	0.331	0.162		0	0.227	0.014	0.99	0.686	0.484	0.436	0.009	0	0.014
		df	13	13	13	13	13	13	0	13	13	13	13	13	13	13	13	13	13
	dd	Correlation	0.407	0.353	0.387	0.382	0.161	0.282	0.854	1	0.386	0.492	-0.278	-0.008	-0.167	-0.252	0.659	0.816	0.461
		Significance	0.132	0.197	0.154	0.16	0.567	0.308	0		0.156	0.063	0.316	0.977	0.551	0.365	0.008	0	0.083
		df	13	13	13	13	13	13	13	0	13	13	13	13	13	13	13	13	13
	nb	Correlation	0.143	0.214	0.184	0.394	0.207	0.312	0.332	0.386	1	0.432	-0.007	0.449	0.187	-0.629	-0.096	0.02	0.707
		Significance	0.61	0.443	0.512	0.146	0.458	0.258	0.227	0.156		0.108	0.979	0.093	0.504	0.012	0.733	0.943	0.003
		df	13	13	13	13	13	13	13	13	0	13	13	13	13	13	13	13	13
	bl	Correlation	0.38	0.412	0.405	0.245	0.024	0.142	0.617	0.492	0.432	1	0.303	0.529	0.137	-0.298	0.238	0.357	0.777
		Significance	0.163	0.127	0.135	0.379	0.932	0.614	0.014	0.063	0.108		0.273	0.043	0.625	0.281	0.393	0.191	0.001
		df	13	13	13	13	13	13	13	13	13	0	13	13	13	13	13	13	13
	lo	Correlation	0.136	0.221	0.183	-0.039	-0.035	-0.038	0.004	-0.278	-0.007	0.303	1	0.045	0.033	-0.207	0.017	0.076	0.388
		Significance	0.63	0.429	0.513	0.889	0.902	0.893	0.99	0.316	0.979	0.273		0.872	0.907	0.459	0.953	0.788	0.153
		df	13	13	13	13	13	13	13	13	13	13	0	13	13	13	13	13	13
	bao	Correlation	0.059	0.209	0.139	0.073	-0.054	0.013	0.114	-0.008	0.449	0.529	0.045	1	0.331	-0.145	-0.296	-0.177	0.469
		Significance	0.834	0.455	0.62	0.796	0.85	0.965	0.686	0.977	0.093	0.043	0.872		0.228	0.605	0.284	0.529	0.078
		df	13	13	13	13	13	13	13	13	13	13	13	0	13	13	13	13	13
	FOB	Correlation	0.024	0.083	0.056	0.012	0.158	0.084	-0.196	-0.167	0.187	0.137	0.033	0.331	1	-0.306	-0.177	-0.35	0.173
		Significance	0.931	0.768	0.843	0.966	0.574	0.766	0.484	0.551	0.504	0.625	0.907	0.228		0.267	0.528	0.201	0.538
		df	13	13	13	13	13	13	13	13	13	13	13	13	0	13	13	13	13
	ASB	Correlation	0.109	0.018	0.063	0.132	0.136	0.137	-0.218	-0.252	-0.629	-0.298	-0.207	-0.145	-0.306	1	-0.314	-0.044	-0.383
		Significance	0.7	0.95	0.823	0.64	0.629	0.627	0.436	0.365	0.012	0.281	0.459	0.605	0.267		0.255	0.876	0.159
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	0	13	13	13
	ZMB	Correlation	0.297	0.188	0.246	-0.049	-0.112	-0.081	0.649	0.659	-0.096	0.238	0.017	-0.296	-0.177	-0.314	1	0.758	0.129
		Significance	0.282	0.502	0.377	0.864	0.691	0.774	0.009	0.008	0.733	0.393	0.953	0.284	0.528	0.255		0.001	0.648
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	0	13	13
	MOW	Correlation	0.535	0.464	0.509	0.298	0.105	0.21	0.846	0.816	0.02	0.357	0.076	-0.177	-0.35	-0.044	0.758	1	0.333
		Significance	0.04	0.082	0.053	0.28	0.709	0.452	0	0	0.943	0.191	0.788	0.529	0.201	0.876	0.001		0.226
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	0	13
	Circ	Correlation	0.521	0.553	0.549	0.432	0.205	0.33	0.616	0.461	0.707	0.777	0.388	0.469	0.173	-0.383	0.129	0.333	1
		Significance	0.046	0.032	0.034	0.108	0.463	0.229	0.014	0.083	0.003	0.001	0.153	0.078	0.538	0.159	0.648	0.226	
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	0
	SagittalArc	Correlation	0.422	0.516	0.48	0.349	0.185	0.277	0.485	0.29	0.642	0.76	0.59	0.42	0.158	-0.504	0.12	0.213	0.924
		Significance	0.118	0.049	0.07	0.202	0.508	0.318	0.067	0.295	0.01	0.001	0.021	0.119	0.574	0.055	0.671	0.447	0
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	FroHArc	Correlation	0.213	0.285	0.255	0.399	0.227	0.323	0.36	0.369	0.952	0.346	0.051	0.382	0.105	-0.593	-0.042	0.057	0.749
		Significance	0.447	0.303	0.358	0.141	0.416	0.24	0.187	0.176	0	0.207	0.856	0.16	0.71	0.02	0.882	0.84	0.001
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ParHArc	Correlation	0.387	0.394	0.399	0.284	0.075	0.188	0.491	0.373	0.404	0.93	0.168	0.6	0.222	-0.162	0.151	0.174	0.725
		Significance	0.154	0.146	0.141	0.304	0.792	0.503	0.063	0.171	0.135	0	0.55	0.018	0.427	0.563	0.591	0.536	0.002
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	OccipHArc	Correlation	0.293	0.402	0.357	0.084	0.104	0.096	0.201	-0.076	0.076	0.338	0.897	-0.034	0.026	-0.33	0.14	0.196	0.488
		Significance	0.289	0.137	0.192	0.766	0.713	0.735	0.472	0.787	0.788	0.218	0	0.904	0.927	0.23	0.618	0.484	0.065
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	LEyeCirc	Correlation	0.819	0.846	0.851	0.646	0.64	0.658	0.554	0.28	0.29	0.365	0.125	0.33	0.339	-0.126	0.179	0.257	0.556
		Significance	0	0	0	0.009	0.01	0.008	0.032	0.312	0.295	0.181	0.657	0.23	0.217	0.656	0.524	0.354	0.031
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13

Control Variables			dfmtleft	dfmtright	dfmtavg	OBHleft	OBHright	OBHavg	ecec	dd	nb	bl	lo	bao	FOB	ASB	ZMB	MOW	Circ
Age	REyeCirc	Correlation	0.862	0.865	0.882	0.727	0.687	0.724	0.617	0.31	0.26	0.359	0.191	0.236	0.051	0.01	0.14	0.352	0.553
		Significance	0	0	0	0.002	0.005	0.002	0.014	0.261	0.35	0.189	0.494	0.397	0.857	0.972	0.618	0.198	0.033
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	OccipArc	Correlation	0.093	0.236	0.17	-0.083	0.053	-0.018	-0.105	-0.388	-0.029	0.264	0.745	0.268	0.324	-0.307	-0.06	-0.229	0.277
		Significance	0.742	0.396	0.544	0.767	0.852	0.948	0.71	0.153	0.918	0.342	0.001	0.335	0.239	0.266	0.831	0.411	0.317
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ParHArc left	Correlation	0.023	-0.106	-0.045	0.154	-0.042	0.061	-0.031	0.007	0.349	0.055	-0.04	0.048	-0.152	0.112	-0.115	-0.056	0.222
		Significance	0.936	0.706	0.875	0.583	0.881	0.828	0.913	0.981	0.202	0.846	0.887	0.864	0.589	0.691	0.684	0.843	0.426
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ParHArc right	Correlation	-0.18	-0.187	-0.188	0.216	0.087	0.157	-0.34	-0.162	0.284	-0.207	-0.156	0.064	-0.077	0.157	-0.276	-0.306	-0.017
		Significance	0.52	0.504	0.502	0.44	0.757	0.575	0.215	0.563	0.305	0.458	0.579	0.821	0.785	0.576	0.319	0.267	0.952
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ParHCholeft	Correlation	-0.053	-0.159	-0.11	0.09	-0.134	-0.018	0.096	0.166	0.305	0.354	0.123	0.068	-0.241	-0.013	0.11	0.097	0.264
		Significance	0.85	0.571	0.696	0.75	0.634	0.949	0.734	0.554	0.27	0.195	0.661	0.809	0.386	0.963	0.697	0.73	0.341
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ParHChoright	Correlation	-0.12	-0.192	-0.161	-0.102	-0.153	-0.13	-0.185	-0.185	0.068	-0.048	0.001	0.173	-0.058	0.012	0.142	-0.234	-0.003
		Significance	0.67	0.493	0.568	0.717	0.586	0.645	0.509	0.508	0.809	0.864	0.998	0.537	0.836	0.966	0.613	0.4	0.993
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ParBArc left	Correlation	0.293	0.23	0.266	0.283	0.012	0.156	0.304	0.19	0.678	0.546	0.117	0.574	0.088	-0.15	-0.152	0.043	0.69
		Significance	0.289	0.41	0.337	0.307	0.966	0.578	0.271	0.498	0.005	0.035	0.677	0.025	0.756	0.595	0.588	0.88	0.004
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ParBArc right	Correlation	0.248	0.244	0.251	0.314	0.029	0.181	0.241	0.146	0.529	0.598	0.254	0.633	0.083	0.021	-0.205	0.1	0.643
		Significance	0.372	0.38	0.366	0.254	0.918	0.518	0.388	0.604	0.043	0.019	0.361	0.011	0.77	0.942	0.464	0.723	0.01
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ParBCholeft	Correlation	0.533	0.496	0.525	0.394	0.142	0.279	0.569	0.358	0.698	0.693	0.332	0.533	0.074	-0.286	0.06	0.274	0.907
		Significance	0.041	0.06	0.045	0.146	0.613	0.313	0.027	0.19	0.004	0.004	0.227	0.041	0.792	0.301	0.832	0.323	0
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ParBChoright	Correlation	0.31	0.277	0.299	0.306	0.054	0.189	0.332	0.192	0.606	0.642	0.345	0.565	0.074	-0.071	-0.188	0.124	0.786
		Significance	0.261	0.318	0.278	0.268	0.847	0.499	0.227	0.492	0.017	0.01	0.209	0.028	0.792	0.8	0.501	0.659	0.001
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	FroBCho	Correlation	0.396	0.387	0.4	0.232	0.128	0.187	0.607	0.616	0.349	0.521	0.067	-0.042	0.138	-0.482	0.6	0.424	0.609
		Significance	0.143	0.154	0.14	0.404	0.648	0.505	0.016	0.014	0.203	0.047	0.811	0.881	0.624	0.069	0.018	0.115	0.016
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13

			Sagittal Arc	FroHArc	ParHArc	OccipHArc	LEyeCirc	REyeCirc	Occip Arc	ParHArcleft	ParHArcright	ParHCholeft	ParHChoright	ParBArcleft	ParBArcright	ParBCholeft	ParBChoright	FroBCho
Age	gop	Correlation	.854	.659	.682	.463	.452	.461	.181	.073	-.153	.159	-.268	.602	.568	.825	.726	.550
		Significance	.000	.008	.005	.082	.090	.084	.518	.796	.586	.570	.333	.018	.027	.000	.002	.034
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	eueu	Correlation	.710	.752	.601	.193	.250	.165	.139	.559	.418	.550	.397	.745	.616	.736	.699	.461
		Significance	.003	.001	.018	.491	.370	.557	.622	.030	.121	.033	.143	.001	.014	.002	.004	.084
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	zyzy	Correlation	.571	.396	.580	.265	.584	.569	.070	.025	-.203	.154	.081	.282	.151	.549	.239	.858
		Significance	.026	.144	.023	.340	.022	.027	.804	.931	.468	.585	.774	.309	.591	.034	.391	.000
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	bab	Correlation	.567	.491	.463	.270	.231	.177	.492	.289	.255	.402	.500	.606	.554	.590	.551	.049
		Significance	.028	.063	.082	.331	.407	.528	.062	.296	.359	.137	.057	.017	.032	.021	.033	.863
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ban	Correlation	.561	.554	.431	.235	.437	.416	.124	-.007	-.316	.068	-.219	.462	.345	.651	.509	.472
		Significance	.030	.032	.108	.399	.104	.123	.659	.981	.252	.810	.433	.083	.208	.009	.053	.076
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	bapr	Correlation	.508	.385	.520	.184	.220	.268	-.121	.142	-.316	.349	-.191	.470	.404	.616	.524	.441
		Significance	.053	.156	.047	.512	.430	.335	.667	.614	.251	.203	.495	.077	.135	.014	.045	.100
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ecmecm	Correlation	.324	-.002	.350	.312	.276	.346	.081	.068	-.224	.293	.182	.059	.105	.268	.100	.530
		Significance	.238	.994	.201	.258	.320	.207	.774	.809	.422	.288	.516	.834	.711	.334	.722	.042
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	pralv	Correlation	.428	.333	.402	.175	.079	.166	-.160	.282	-.234	.476	-.070	.433	.354	.530	.489	.314
		Significance	.111	.225	.138	.533	.781	.554	.570	.308	.401	.073	.804	.107	.196	.042	.064	.254
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	AUB	Correlation	.606	.273	.655	.361	.547	.515	.210	.047	-.187	.190	.059	.268	.163	.500	.245	.824
		Significance	.017	.326	.008	.186	.035	.049	.453	.867	.504	.497	.836	.335	.562	.058	.378	.000
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	npr	Correlation	.832	.790	.521	.473	.592	.539	.283	.113	.151	.114	.174	.465	.280	.715	.410	.718
		Significance	.000	.000	.047	.075	.020	.038	.306	.689	.591	.686	.534	.081	.312	.003	.129	.003
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	ftft	Correlation	.484	.328	.547	.176	.504	.559	-.177	.064	-.216	.154	-.154	.317	.198	.546	.293	.693
		Significance	.067	.232	.035	.532	.055	.030	.529	.822	.439	.585	.585	.250	.479	.035	.289	.004
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	fmtfmt	Correlation	.675	.587	.502	.379	.750	.687	.515	-.297	-.229	-.252	.071	.165	.076	.491	.235	.673
		Significance	.006	.021	.056	.164	.001	.005	.049	.283	.412	.365	.802	.558	.788	.063	.399	.006
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	nns	Correlation	.776	.552	.688	.404	.376	.276	.288	.187	-.064	.283	.009	.518	.469	.677	.611	.689
		Significance	.001	.033	.005	.135	.167	.319	.298	.504	.820	.307	.974	.048	.078	.006	.016	.004
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	alal	Correlation	.255	.126	.138	.252	.251	.295	-.123	-.072	-.382	.024	-.182	.088	.078	.344	.171	.469
		Significance	.360	.654	.624	.364	.366	.285	.662	.799	.160	.934	.516	.756	.781	.209	.542	.078
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	decleft	Correlation	.443	.243	.242	.424	.705	.731	.121	.051	-.167	-.018	-.191	.170	.128	.417	.203	.482
		Significance	.098	.383	.385	.115	.003	.002	.668	.856	.553	.950	.495	.544	.648	.122	.468	.069
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	decright	Correlation	.563	.225	.330	.585	.706	.710	.395	-.078	-.342	-.182	-.280	.182	.185	.457	.319	.400
		Significance	.029	.421	.230	.022	.003	.003	.145	.781	.212	.516	.312	.516	.510	.087	.246	.139
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	decavg	Correlation	.519	.245	.294	.518	.735	.752	.256	-.008	-.257	-.096	-.241	.183	.160	.454	.267	.463
		Significance	.048	.380	.288	.048	.002	.001	.357	.977	.355	.733	.386	.514	.568	.089	.336	.082
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	dfmtleft	Correlation	.422	.213	.387	.293	.819	.862	.093	.023	-.180	-.053	-.120	.293	.248	.533	.310	.396
		Significance	.118	.447	.154	.289	.000	.000	.742	.936	.520	.850	.670	.289	.372	.041	.261	.143
		df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13

		SagittalArc	FroHArc	ParHArc	OccipHArc	LEyeCirc	REyeCirc	Occip Arc	ParHAr cleft	ParHArc right	ParHCh oleft	ParHChor ight	ParBArc left	ParBArc right	ParBCho left	ParBChorig ht	FroBCh o
dfmtright	Correlation	0.516	0.285	0.394	0.402	0.846	0.865	0.236	-0.106	-0.187	-0.159	-0.192	0.23	0.244	0.496	0.277	0.387
	Significance	0.049	0.303	0.146	0.137	0	0	0.396	0.706	0.504	0.571	0.493	0.41	0.38	0.06	0.318	0.154
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
dfmtavg	Correlation	0.48	0.255	0.399	0.357	0.851	0.882	0.17	-0.045	-0.188	-0.11	-0.161	0.266	0.251	0.525	0.299	0.4
	Significance	0.07	0.358	0.141	0.192	0	0	0.544	0.875	0.502	0.696	0.568	0.337	0.366	0.045	0.278	0.14
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
OBHleft	Correlation	0.349	0.399	0.284	0.084	0.646	0.727	-0.083	0.154	0.216	0.09	-0.102	0.283	0.314	0.394	0.306	0.232
	Significance	0.202	0.141	0.304	0.766	0.009	0.002	0.767	0.583	0.44	0.75	0.717	0.307	0.254	0.146	0.268	0.404
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
OBHright	Correlation	0.185	0.227	0.075	0.104	0.64	0.687	0.053	-0.042	0.087	-0.134	-0.153	0.012	0.029	0.142	0.054	0.128
	Significance	0.508	0.416	0.792	0.713	0.01	0.005	0.852	0.881	0.757	0.634	0.586	0.966	0.918	0.613	0.847	0.648
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
OBHavg	Correlation	0.277	0.323	0.188	0.096	0.658	0.724	-0.018	0.061	0.157	-0.018	-0.13	0.156	0.181	0.279	0.189	0.187
	Significance	0.318	0.24	0.503	0.735	0.008	0.002	0.948	0.828	0.575	0.949	0.645	0.578	0.518	0.313	0.499	0.505
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
ecec	Correlation	0.485	0.36	0.491	0.201	0.554	0.617	-0.105	-0.031	-0.34	0.096	-0.185	0.304	0.241	0.569	0.332	0.607
	Significance	0.067	0.187	0.063	0.472	0.032	0.014	0.71	0.913	0.215	0.734	0.509	0.271	0.388	0.027	0.227	0.016
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
dd	Correlation	0.29	0.369	0.373	-0.076	0.28	0.31	-0.388	0.007	-0.162	0.166	-0.185	0.19	0.146	0.358	0.192	0.616
	Significance	0.295	0.176	0.171	0.787	0.312	0.261	0.153	0.981	0.563	0.554	0.508	0.498	0.604	0.19	0.492	0.014
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
nb	Correlation	0.642	0.952	0.404	0.076	0.29	0.26	-0.029	0.349	0.284	0.305	0.068	0.678	0.529	0.698	0.606	0.349
	Significance	0.01	0	0.135	0.788	0.295	0.35	0.918	0.202	0.305	0.27	0.809	0.005	0.043	0.004	0.017	0.203
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
bl	Correlation	0.76	0.346	0.93	0.338	0.365	0.359	0.264	0.055	-0.207	0.354	-0.048	0.546	0.598	0.693	0.642	0.521
	Significance	0.001	0.207	0	0.218	0.181	0.189	0.342	0.846	0.458	0.195	0.864	0.035	0.019	0.004	0.01	0.047
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
lo	Correlation	0.59	0.051	0.168	0.897	0.125	0.191	0.745	-0.04	-0.156	0.123	0.001	0.117	0.254	0.332	0.345	0.067
	Significance	0.021	0.856	0.55	0	0.657	0.494	0.001	0.887	0.579	0.661	0.998	0.677	0.361	0.227	0.209	0.811
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
bao	Correlation	0.42	0.382	0.6	-0.034	0.33	0.236	0.268	0.048	0.064	0.068	0.173	0.574	0.633	0.533	0.565	-0.042
	Significance	0.119	0.16	0.018	0.904	0.23	0.397	0.335	0.864	0.821	0.809	0.537	0.025	0.011	0.041	0.028	0.881
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
FOB	Correlation	0.158	0.105	0.222	0.026	0.339	0.051	0.324	-0.152	-0.077	-0.241	-0.058	0.088	0.083	0.074	0.074	0.138
	Significance	0.574	0.71	0.427	0.927	0.217	0.857	0.239	0.589	0.785	0.386	0.836	0.756	0.77	0.792	0.792	0.624
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
ASB	Correlation	-0.504	-0.593	-0.162	-0.33	-0.126	0.01	-0.307	0.112	0.157	-0.013	0.012	-0.15	0.021	-0.286	-0.071	-0.482
	Significance	0.055	0.02	0.563	0.23	0.656	0.972	0.266	0.691	0.576	0.963	0.966	0.595	0.942	0.301	0.8	0.069
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
ZMB	Correlation	0.12	-0.042	0.151	0.14	0.179	0.14	-0.06	-0.115	-0.276	0.11	0.142	-0.152	-0.205	0.06	-0.188	0.6
	Significance	0.671	0.882	0.591	0.618	0.524	0.618	0.831	0.684	0.319	0.697	0.613	0.588	0.464	0.832	0.501	0.018
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
MOW	Correlation	0.213	0.057	0.174	0.196	0.257	0.352	-0.229	-0.056	-0.306	0.097	-0.234	0.043	0.1	0.274	0.124	0.424
	Significance	0.447	0.84	0.536	0.484	0.354	0.198	0.411	0.843	0.267	0.73	0.4	0.88	0.723	0.323	0.659	0.115
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Circ	Correlation	0.924	0.749	0.725	0.488	0.556	0.553	0.277	0.222	-0.017	0.264	-0.003	0.69	0.643	0.907	0.786	0.609
	Significance	0	0.001	0.002	0.065	0.031	0.033	0.317	0.426	0.952	0.341	0.993	0.004	0.01	0	0.001	0.016
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
SagittalArc	Correlation	1	0.684	0.698	0.707	0.509	0.511	0.524	0.108	-0.013	0.248	0.057	0.579	0.539	0.837	0.679	0.581
	Significance		0.005	0.004	0.003	0.053	0.052	0.045	0.701	0.965	0.372	0.84	0.024	0.038	0	0.005	0.023
	df	0	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
FroHArc	Correlation	0.684	1	0.327	0.186	0.389	0.373	0.058	0.285	0.252	0.183	0.102	0.599	0.424	0.705	0.549	0.457
	Significance	0.005		0.234	0.506	0.152	0.171	0.837	0.303	0.364	0.515	0.717	0.018	0.115	0.003	0.034	0.087
	df	13	0	13	13	13	13	13	13	13	13	13	13	13	13	13	13

		SagittalArc	FroHArc	ParHArc	OccipHArc	LEyeCirc	REyeCirc	OccipArc	ParHArcleft	ParHArcright	ParHCholeft	ParHCoright	ParBArcleft	ParBArcright	ParBCholeft	ParBCoright	FroBCho
ParHArc	Correlation	0.698	0.327	1	0.183	0.416	0.363	0.227	0.202	0.036	0.434	0.22	0.631	0.654	0.7	0.65	0.485
	Significance	0.004	0.234		0.514	0.123	0.184	0.417	0.471	0.898	0.106	0.432	0.012	0.008	0.004	0.009	0.067
	df	13	13	0	13	13	13	13	13	13	13	13	13	13	13	13	13
OccipHArc	Correlation	0.707	0.186	0.183	1	0.306	0.364	0.751	-0.23	-0.277	-0.084	-0.157	0.037	0.076	0.382	0.24	0.316
	Significance	0.003	0.506	0.514		0.268	0.183	0.001	0.41	0.318	0.766	0.575	0.896	0.788	0.16	0.388	0.251
	df	13	13	13	0	13	13	13	13	13	13	13	13	13	13	13	13
LEyeCirc	Correlation	0.509	0.389	0.416	0.306	1	0.935	0.416	-0.258	-0.205	-0.315	-0.035	0.18	0.137	0.476	0.2	0.511
	Significance	0.053	0.152	0.123	0.268		0	0.123	0.354	0.463	0.253	0.901	0.522	0.626	0.073	0.475	0.052
	df	13	13	13	13	0	13	13	13	13	13	13	13	13	13	13	13
REyeCirc	Correlation	0.511	0.373	0.363	0.364	0.935	1	0.367	-0.224	-0.209	-0.238	-0.095	0.183	0.165	0.505	0.266	0.413
	Significance	0.052	0.171	0.184	0.183	0		0.178	0.423	0.455	0.394	0.735	0.514	0.557	0.055	0.338	0.126
	df	13	13	13	13	13	0	13	13	13	13	13	13	13	13	13	13
OccipArc	Correlation	0.524	0.058	0.227	0.751	0.416	0.367	1	-0.467	-0.315	-0.294	0.04	-0.121	-0.047	0.158	0.045	0.208
	Significance	0.045	0.837	0.417	0.001	0.123	0.178		0.08	0.252	0.288	0.888	0.668	0.868	0.574	0.874	0.457
	df	13	13	13	13	13	13	0	13	13	13	13	13	13	13	13	13
ParHArcleft	Correlation	0.108	0.285	0.202	-0.23	-0.258	-0.224	-0.467	1	0.751	0.845	0.553	0.727	0.658	0.438	0.588	-0.168
	Significance	0.701	0.303	0.471	0.41	0.354	0.423	0.08		0.001	0	0.032	0.002	0.008	0.103	0.021	0.55
	df	13	13	13	13	13	13	13	0	13	13	13	13	13	13	13	13
ParHArcright	Correlation	-0.013	0.252	0.036	-0.277	-0.205	-0.209	-0.315	0.751	1	0.62	0.69	0.461	0.438	0.183	0.281	-0.24
	Significance	0.965	0.364	0.898	0.318	0.463	0.455	0.252	0.001		0.014	0.004	0.084	0.103	0.513	0.31	0.389
	df	13	13	13	13	13	13	13	13	0	13	13	13	13	13	13	13
ParHCholeft	Correlation	0.248	0.183	0.434	-0.084	-0.315	-0.238	-0.294	0.845	0.62	1	0.576	0.651	0.668	0.434	0.59	-0.041
	Significance	0.372	0.515	0.106	0.766	0.253	0.394	0.288	0	0.014		0.025	0.009	0.006	0.106	0.021	0.883
	df	13	13	13	13	13	13	13	13	13	13	0	13	13	13	13	13
ParHChoright	Correlation	0.057	0.102	0.22	-0.157	-0.035	-0.095	0.04	0.553	0.69	0.576	1	0.342	0.286	0.187	0.17	-0.008
	Significance	0.84	0.717	0.432	0.575	0.901	0.735	0.888	0.032	0.004	0.025		0.212	0.301	0.505	0.545	0.977
	df	13	13	13	13	13	13	13	13	13	13	0	13	13	13	13	13
ParBArcleft	Correlation	0.579	0.599	0.631	0.037	0.18	0.183	-0.121	0.727	0.461	0.651	0.342	1	0.918	0.883	0.917	0.051
	Significance	0.024	0.018	0.012	0.896	0.522	0.514	0.668	0.002	0.084	0.009	0.212		0	0	0	0.857
	df	13	13	13	13	13	13	13	13	13	13	13	0	13	13	13	13
ParBArcright	Correlation	0.539	0.424	0.654	0.076	0.137	0.165	-0.047	0.658	0.438	0.668	0.286	0.918	1	0.794	0.932	-0.068
	Significance	0.038	0.115	0.008	0.788	0.626	0.557	0.868	0.008	0.103	0.006	0.301	0		0	0	0.811
	df	13	13	13	13	13	13	13	13	13	13	13	13	0	13	13	13
ParBCholeft	Correlation	0.837	0.705	0.7	0.382	0.476	0.505	0.158	0.438	0.183	0.434	0.187	0.883	0.794	1	0.896	0.349
	Significance	0	0.003	0.004	0.16	0.073	0.055	0.574	0.103	0.513	0.106	0.505	0	0		0	0.202
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	0	13	13
ParBChoright	Correlation	0.679	0.549	0.65	0.24	0.2	0.266	0.045	0.588	0.281	0.59	0.17	0.917	0.932	0.896	1	0.054
	Significance	0.005	0.034	0.009	0.388	0.475	0.338	0.874	0.021	0.31	0.021	0.545	0	0	0		0.848
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	0	13
FroBCho	Correlation	0.581	0.457	0.485	0.316	0.511	0.413	0.208	-0.168	-0.24	-0.041	-0.008	0.051	-0.068	0.349	0.054	1
	Significance	0.023	0.087	0.067	0.251	0.052	0.126	0.457	0.55	0.389	0.883	0.977	0.857	0.811	0.202	0.848	
	df	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	0

Appendix 6: Final Cranial Ratios Used in Statistical Analysis.

- ft-ft/zy-zy
- ft-ft/AUB
- n-ns/g-op
- n-ns/eu-eu
- n-ns/circ
- ec-ec/zy-zy
- ec-ec/ba-pr
- d-fmt/circ
- n-pr/g-op
- n-pr/eu-eu
- d-fmt/zy-zy
- n-pr/SagArc
- n-pr/n-b
- n-pr/eyecirc
- n-pr/m-parharc
- ft-ft/ba-pr
- ft-ft/pr-alv
- n-ns/eyecirc
- eyecirc/circ
- ft-ft/ec-ec
- d-fmt/ba-b
- d-fmt/AUB
- n-pr/circ
- eyecirc/ec-ec
- n-pr/AUB
- eyecirc/AUB
- ft-ft/ZMB
- ft-ft/frobcho
- eyecirc/fmt-fmt
- n-pr/ASB
- eyecirc/sagarc
- ft-ft/b-l
- n-pr/zy-zy
- n-pr/ft-ft
- n-pr/fmt-fmt
- n-pr/d-fmt
- n-pr/ec-ec
- n-pr/frobcho
- ft-ft/g-op
- ft-ft/d-ec
- ft-ft/circ

Appendix 7: Plots of Juvenile Cranial Ratios vs. Age. Each of the ratios graphed against age.

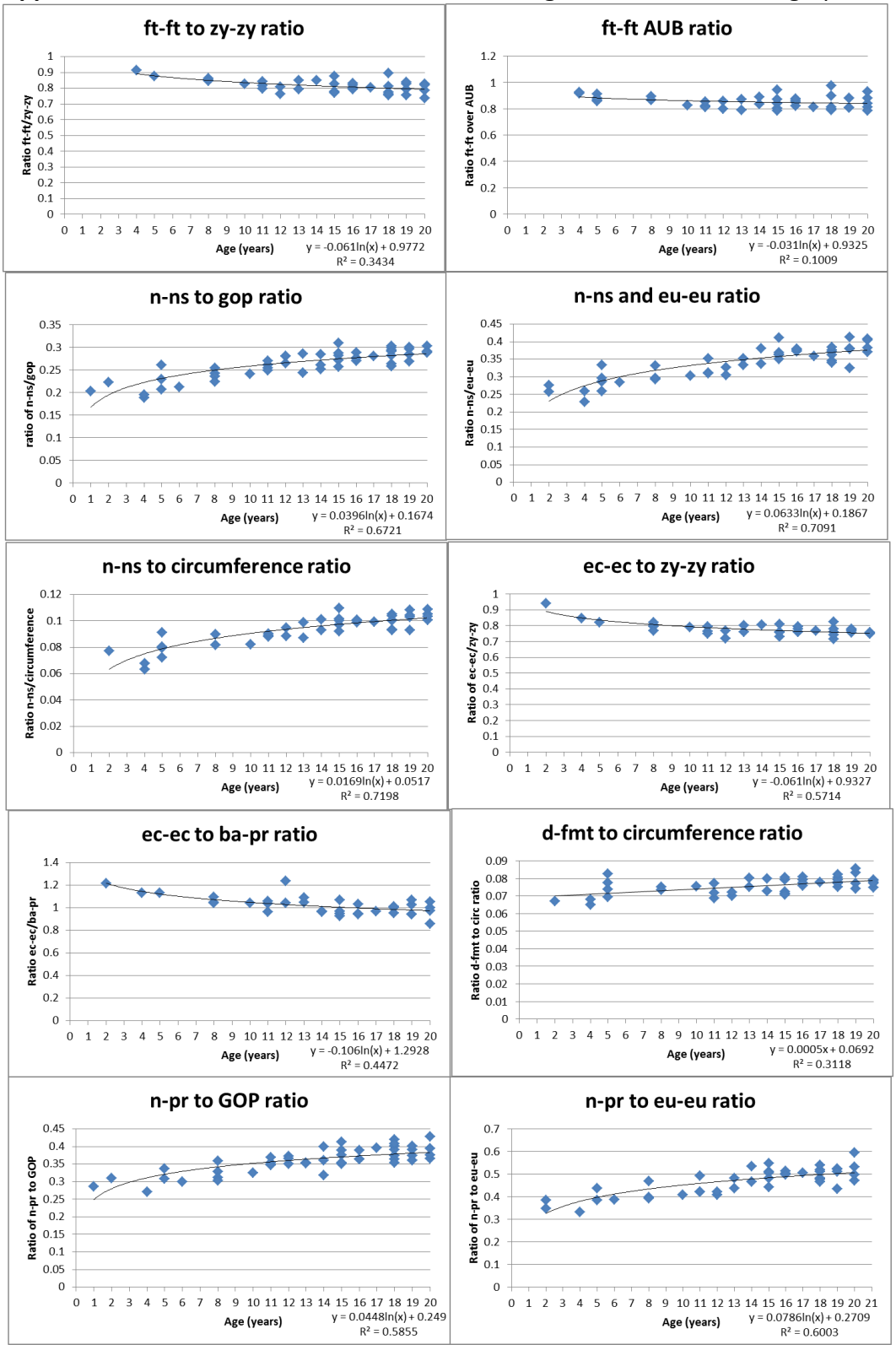

Figure 9: Plots of Measurement Against Age for ft-ft to zy-zy ratio, ft-ft to AUB ratio, n-ns to gop ratio, n-ns to eu-eu ratio, n-ns to circumference ratio, ec-ec to zy-zy ratio, ec-ec to ba-pr ratio, d-fmt to circumference ratio, n-pr to gop ratio, n-pr to eu-eu ratio.

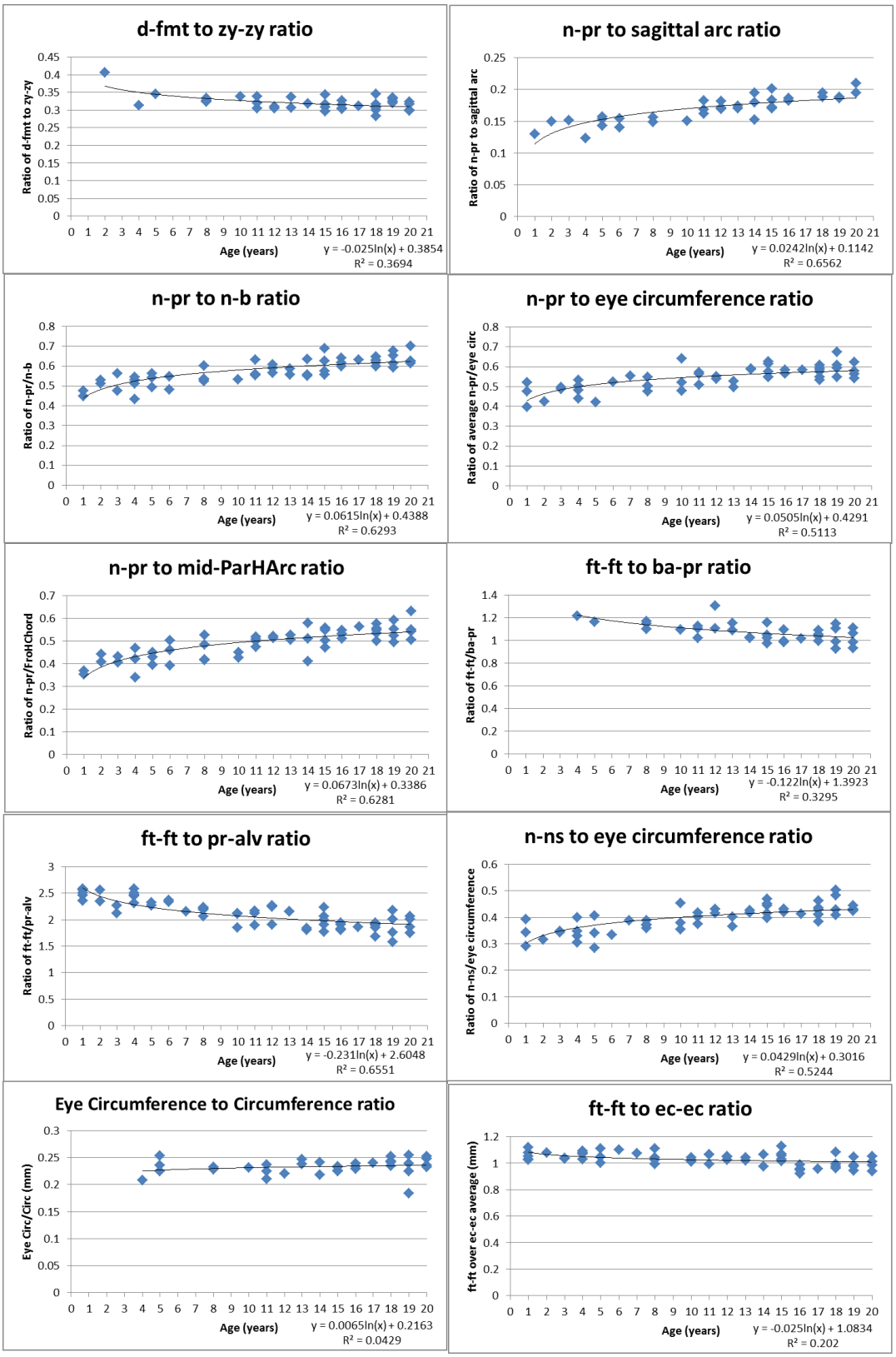

Figure 10: Plots of Measurement Against Age for d-fmtto zy-zy ratio, n-pr to sagittal arc ratio, n-pr to n-b ratio, n-pr to eye circumference ratio, n-pr to mid-ParHArc ratio, ft-ft to ba-pr ratio, ft-ft to pr-alv ratio, n-ns to eye circumference ratio, eye circumference to circumference ratio, ft-ft to ec-ec ratio.

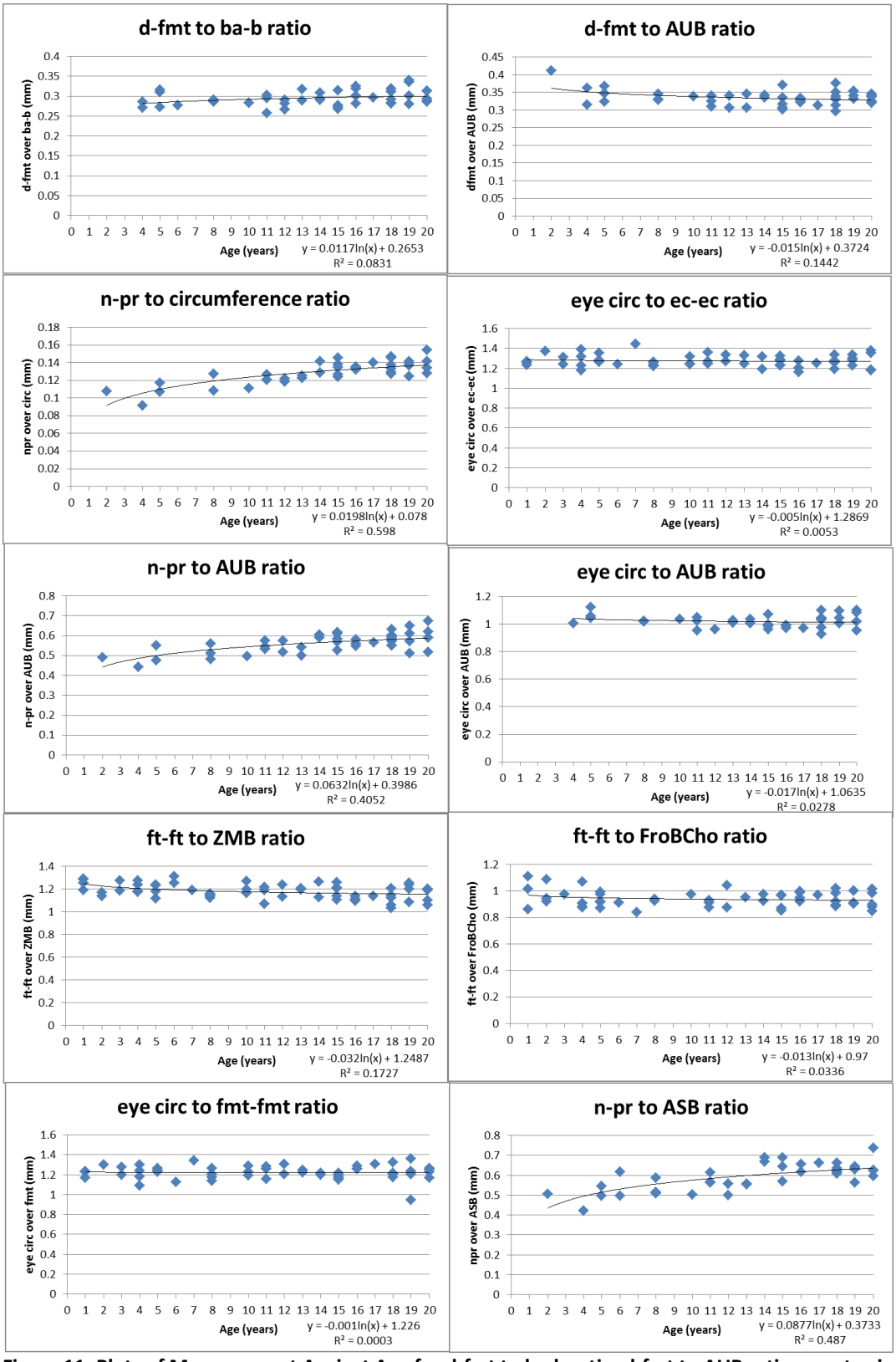

Figure 11: Plots of Measurement Against Age for d-fmt to ba-b ratio, d-fmt to AUB ratio, n-pr to circumference ratio, eye circumference to ec-ec ratio, n-pr to AUB ratio, eye circumference to AUB ratio, ft-ft to ZMB ratio, ft—ft to FroBCho ratio, eye circumference to fmt-fmt ratio, and n-pr and ASB ratio.

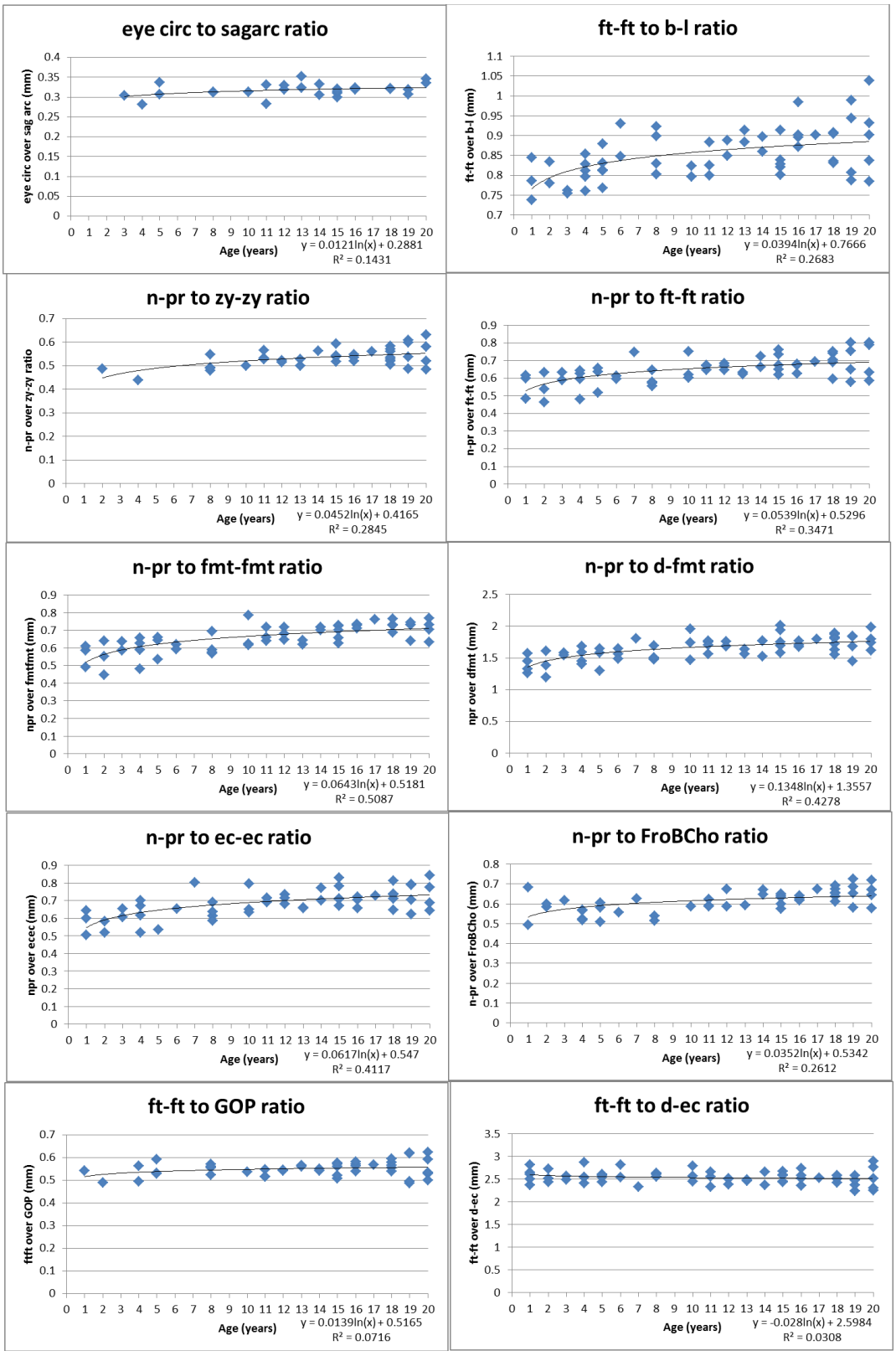

Figure 12: Plots of Measurement Against Age for eye circumference to sagarc ratio, ft-ft to b-l ratio, n-pr to zy-zy ratio, n-pr to ft-ft ratio, n-pr to fmt-fmt ratio, n-pr to d-fmt ratio, n-pr to ec-ec ratio, n-pr to FroBCho ratio, ft-ft to gop ratio, and ft-ft to d-ec ratio.

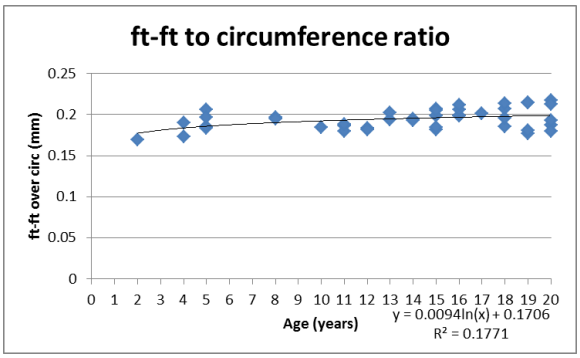

Figure 13: Plots of Measurement Against Age for ft-ft to circumference ratio.

Appendix 8: Correlations of Variables and Ratios with Age.

Table 7: Squared Pearson's Corellation (r^2) for the Measured Values

Measurement	r^2 values
Nasal Height/n-ns	0.78
Upper Facial Height/n-pr	0.7793
Max Alveolar Length/pr-alv	0.7768
Orbital Breadth/d-ec	0.7245
Zygomaxillary Breadth/ZMB	0.7069
Bizygomatic Breadth/zy-zy	0.7057
Dacryon to FMT/d-fmt	0.7016
Frontal Breadth Chord/frobcho	0.6867
Upper Facial Breadth/fmt-fmt	0.6845
Biauricular Breadth/AUB	0.6776
Eye Circumference/eyecirc	0.6665
Max Alveolar Breadth/ecm-ecm	0.6574
Biorbital Breadth/ec-ec	0.6248
Frontal Chord/n-b	0.5764
Minimum Facial Breadth/ft-ft	0.5612
Nasal Breadth/al-al	0.5518
Max Length/g-op	0.5277
Basion to Prostheon/ba-pr	0.524
Basion to Bregma/ba-b	0.4513
Mid-Parietal Breadth Chord/m-parbcho	0.4316
Cranial Base Length/ba-n	0.3664
Orbital Height/OBH	0.3659
Sagittal Arc/sagarc	0.3445
Mid-Orbital Width/MOW	0.3411
Frontal Height Arc/froharc	0.3288
Circumference/circ	0.3195
Parietal Chord/b-l	0.2943
Interorbital Breadth/d-d	0.2818
Occipital Chord/l-o	0.2506
Occipital Breadth Arc/occiparc	0.2297
Parietal Height Arc/parharc	0.2263
Mid-Parietal Breadth Arc/m-parbarc	0.2104
Occipital Height Arc/occipharc	0.1996
Max Breadth/eu-eu	0.1898
Mid-Parietal Height Chord/m-parhcho	0.1028
Mid-Parietal Height Arc/m-parharc	0.0031

Table 8: Squared Pearson's Corellation (r^2) for the Ratios.

Ratio	r^2 Values
n-ns/circ	0.7198
n-ns/eu-eu	0.7091
n-ns/GOP	0.6721
n-pr/SagArc	0.6562
ft-ft/pr-alv	0.6551
n-pr/n-b	0.6293
n-pr/mid-ParHArc	0.6281
n-pr/eu-eu	0.6003
n-pr/circ	0.598
n-pr/GOP	0.5855
ec-ec/zy-zy	0.5714
n-ns/eyecirc	0.5244
n-pr/eyecirc	0.5113
n-pr/fmt-fmt	0.5087
n-pr/ASB	0.487
ec-ec/ba-pr	0.4472
n-pr/d-fmt	0.4278
n-pr/ec-ec	0.4117
n-pr/AUB	0.4052
d-fmt/zy-zy	0.3694
n-pr/ft-ft	0.3471
ft-ft/zy-zy	0.3434
ft-ft/ba-pr	0.3295
d-fmt/circ	0.3118
n-pr/zy-zy	0.2845
ft-ft/b-l	0.2683
n-pr/FroBCho	0.2612
ft-ft/ec-ec	0.202
ft-ft/circ	0.1771
ft-ft/ZMB	0.1727
d-fmt/AUB	0.1442
eyecirc/SagArc	0.1431
ft-ft/AUB	0.1009
d-fmt/ba-b	0.0831
ft-ft/GOP	0.0716
eyecirc/circ	0.0429
ft-ft/FroBCho	0.0336
ft-ft/d-ec	0.0308
eyecirc/AUB	0.0278
eyecirc/ec-ec	0.0023
eyecirc/fmt-fmt	0.0003

Appendix 9: Results of Independent Samples T-Tests for Differences between Female and Male Means for the Variables and Ratios.

Table 9: Descriptive Statistics for Males and Females

Group Statistics					
	SEXCODE	N	Mean	Std. Deviation	Std. Error Mean
gop	Female	30	168.3	9.6629	1.7642
	Male	22	176.114	12.0297	2.5647
eueu	Female	27	131.333	6.9018	1.3282
	Male	20	135.275	7.2484	1.6208
zyzy	Female	22	113.227	10.6209	2.2644
	Male	18	123.5	8.3296	1.9633
bab	Female	29	122.4941	13.02201	2.41813
	Male	16	129.625	7.19606	1.79902
ban	Female	29	89.3803448	11.14961121	2.070430825
	Male	17	96.8235294	6.630754992	1.608194306
bapr	Female	25	84.561	15.99632093	3.199264186
	Male	16	94.6871875	8.390936175	2.097734044
ecmecm	Female	27	54.5307407	6.96059606	1.339567336
	Male	34	56.3077941	8.198033596	1.405951163
pralv	Female	31	44.5940323	7.93360074	1.424916757
	Male	35	43.8495714	9.430254688	1.594003975
AUB	Female	27	108.378704	9.091294398	1.749620423
	Male	19	115.602368	9.240013433	2.119804463
npr	Female	30	58.544	8.194694709	1.496139715
	Male	33	60.2495455	10.71043893	1.864448104
ftft	Female	32	88.6114063	5.613352491	0.992309903
	Male	34	88.2436765	8.445972979	1.448472416
fmtfmt	Female	32	91.5185938	8.037810269	1.420897537
	Male	35	91.4125714	12.01197732	2.030394748
nns	Female	35	42.6997143	6.660851158	1.125889339
	Male	34	43.5945588	8.423312381	1.444586156
alal	Female	26	20.9903846	2.921484528	0.572950254
	Male	33	20.5160606	3.279517342	0.570890692
decleft	Female	30	36.4345	2.829577265	0.516607765
	Male	34	35.9229412	4.37299809	0.749962985
decright	Female	35	36.4275714	2.366584276	0.400025754
	Male	33	36.3977273	4.543293321	0.790885852
decavg	Female	37	36.2657432	2.634546059	0.433116704
	Male	35	36.0428571	4.409966076	0.745420318
dfmtleft	Female	35	35.2654286	2.702497856	0.456805512
	Male	37	35.3245946	4.517526114	0.742676718
dfmtright	Female	38	35.5207895	2.719344497	0.441135929
	Male	36	35.6754167	4.510472794	0.751745466
dfmtavg	Female	39	35.3925	2.634163579	0.421803751
	Male	37	35.5002027	4.472020127	0.73519558
OBHleft	Female	30	33.6045	2.225917614	0.406395096
	Male	36	33.0741667	2.710213618	0.45170227
OBHright	Female	36	33.0802778	2.505956317	0.417659386
	Male	34	32.8457353	2.429535475	0.416661897
OBHavg	Female	37	33.1941216	2.494928969	0.410163796
	Male	36	32.8799306	2.544944603	0.424157434
ecec	Female	27	87.2533333	6.153343213	1.184211453
	Male	31	87.2753226	10.20819499	1.833445944

	SEXCODE	N	Mean	Std. Deviation	Std. Error Mean
dd	Female	33	19.1093939	3.430887221	0.597240805
	Male	35	19.2567143	3.508524271	0.593048843
nb	Female	38	100.935526	7.065646409	1.146199202
	Male	26	104.095192	8.941800208	1.753631298
bl	Female	36	106.806389	6.614221001	1.102370167
	Male	30	110.3365	8.346121869	1.523786405
lo	Female	35	90.736	5.319311211	0.899127701
	Male	25	92.1654	5.805826082	1.161165216
bao	Female	32	33.7182813	3.262823488	0.576791153
	Male	23	35.9776087	2.297845765	0.479133963
FOB	Female	29	28.1493103	2.40872548	0.447289093
	Male	25	28.7616	3.233902995	0.646780599
ASB	Female	26	103.253846	5.423020064	1.063541736
	Male	20	102.403	13.69894026	3.063176164
ZMB	Female	25	79.1056	7.386410709	1.477282142
	Male	32	77.5629688	10.57993817	1.870286506
MOW	Female	26	47.9975	6.682014554	1.310450869
	Male	30	46.9403333	8.746138846	1.596819179
Circ	Female	25	478.92	21.9909	4.3982
	Male	19	501.447	23.7352	5.4452
SagittalArc	Female	27	347.333	16.2422	3.1258
	Male	13	360.962	23.0538	6.394
FroHArc	Female	34	117.809	7.7567	1.3303
	Male	21	121.405	10.6673	2.3278
ParHArc	Female	35	118.786	7.2935	1.2328
	Male	30	124.017	9.011	1.6452
OccipHArc	Female	33	108.939	7.9478	1.3835
	Male	21	110.262	9.8471	2.1488
LEyeCirc	Female	30	111.083	6.8507	1.2508
	Male	32	111.578	12.0991	2.1388
REyeCirc	Female	32	109.719	6.8237	1.2063
	Male	31	110.79	14.302	2.5687
EyeCircAvg	Female	25	110.43	5.83966	1.16793
	Male	29	111.7069	11.55771	2.14621
OccipArc	Female	25	122.84	7.6263	1.5253
	Male	20	125.8	7.6612	1.7131
ParHArcleft	Female	35	117.257	6.5724	1.1109
	Male	25	116.04	12.8719	2.5744
ParHArcright	Female	33	118.621	7.0589	1.2288
	Male	24	117.333	12.7924	2.6112
ParHCholeft	Female	35	98.6958571	4.217461162	0.712881049
	Male	24	98.0583333	10.5748185	2.158575787
ParHChoright	Female	33	99.2051515	5.139309974	0.894639033
	Male	25	98.6768	10.05412134	2.010824269
ParBArcleft	Female	34	125.706	7.2196	1.2382
	Male	24	128	15.9551	3.2568
ParBArcright	Female	36	126.097	6.8105	1.1351
	Male	23	127.87	15.3602	3.2028
ParBCholeft	Female	34	109.352206	5.917077774	1.014770466
	Male	25	111.2758	13.51078355	2.702156711
ParBChoright	Female	36	108.2975	5.298544611	0.883090769
	Male	22	110.097273	13.54954645	2.888773008
FroBCho	Female	28	97.196	8.2173	1.5529
	Male	27	96.704	14.4204	2.7752

	SEXCODE	N	Mean	Std. Deviation	Std. Error Mean
ftftoverzyzy	Female	21	0.80211725	0.081127895	0.017703558
	Male	16	0.77453227	0.042218486	0.010554622
ftftoverAUB	Female	26	0.83278258	0.067613773	0.013260152
	Male	17	0.8187401	0.050939466	0.012354635
ftftoverecec	Female	27	1.03100503	0.057401245	0.011046875
	Male	30	1.03327712	0.046377603	0.008467353
nnsovergop	Female	29	0.2613174	0.028911716	0.005368771
	Male	21	0.26814291	0.031966133	0.006975582
nnsovereueu	Female	26	0.3357943	0.044101045	0.008648927
	Male	20	0.34754524	0.047449572	0.010610047
nnsovercirc	Female	24	0.09278181	0.010747453	0.002193815
	Male	19	0.09538054	0.011326626	0.002598506
ececoverzyzy	Female	21	0.78347281	0.046588487	0.010166441
	Male	17	0.77042345	0.028960648	0.007023989
ececoverbapr	Female	21	1.03472278	0.089646678	0.019562509
	Male	15	1.0026822	0.059475728	0.015356567
ececoverdd	Female	27	4.52900009	0.579131105	0.111453833
	Male	31	4.53773055	0.533839764	0.095880452
ddoverftft	Female	32	0.21103519	0.024974504	0.00441491
	Male	35	0.2115266	0.023824226	0.004027029
ddoverMOW	Female	26	0.40818927	0.047314098	0.009279058
	Male	30	0.41229927	0.052683091	0.009618573
CircoverGOP	Female	24	2.84812823	0.072019002	0.014700817
	Male	19	2.82611395	0.055517141	0.012736506
fmtoverLeyecirc	Female	29	0.81336795	0.047605309	0.008840084
	Male	30	0.8129209	0.035625099	0.006504223
dfmtavgoverbab	Female	29	0.30014972	0.051331943	0.009532103
	Male	16	0.30060703	0.019415835	0.004853959
dfmtavgoverAUB	Female	27	0.33361972	0.022127984	0.004258532
	Male	19	0.33661212	0.020731114	0.004756044
dfmtavgoverftft	Female	32	0.3895199	0.018050156	0.003190847
	Male	35	0.38966186	0.017926128	0.003030069
dfmtavgoverecec	Female	27	0.41232336	0.01599267	0.003077791
	Male	31	0.41072021	0.017422946	0.003129253
dfmtavgovercirc	Female	25	0.07539708	0.00432674	0.000865348
	Male	19	0.07664736	0.004962196	0.001138406
nprovergop	Female	27	0.35468793	0.034913324	0.006719072
	Male	20	0.36747199	0.036262569	0.008108557
nprovereueu	Female	23	0.45879406	0.055824462	0.011640205
	Male	19	0.47656987	0.062164441	0.014261501
eyecircovercirc	Female	21	0.23203985	0.010987296	0.002397625
	Male	16	0.23478744	0.017128714	0.004282179
dfmtoverzyzy	Female	22	0.32111738	0.02353323	0.005017302
	Male	18	0.31831238	0.016445106	0.003876149
nproversagarc	Female	24	0.16845404	0.019914533	0.004065037
	Male	12	0.17179072	0.022527393	0.006503098
nprovercirc	Female	21	0.12697081	0.012591359	0.00274766
	Male	18	0.13111825	0.013250434	0.003123157
eyecircoverecec	Female	24	1.26624821	0.056272164	0.011486507
	Male	28	1.27146104	0.092921352	0.017560485
nproverAUB	Female	23	0.55007714	0.047123907	0.009826014
	Male	18	0.57380475	0.05063477	0.01193473
dfmtovereyecircavg	Female	25	0.32513727	0.008890939	0.001778188
	Male	29	0.3256392	0.02914798	0.005412644

	SEXCODE	N	Mean	Std. Deviation	Std. Error Mean
dfmtoverAUB	Female	27	0.33361972	0.022127984	0.004258532
	Male	19	0.33661212	0.020731114	0.004756044
eyecircoverAUB	Female	22	1.01258296	0.045472528	0.009694776
	Male	17	1.01096969	0.079288962	0.019230398
ftftoverZMB	Female	25	1.16959505	0.067305826	0.013461165
	Male	32	1.18954019	0.064123642	0.011335566
ftftoverFroBCho	Female	28	0.93750547	0.054867153	0.010368917
	Male	26	0.9832275	0.219259468	0.043000319
eyecircoverfmt	Female	24	1.22032184	0.055438649	0.011316367
	Male	28	1.22525729	0.078593301	0.014852738
dfmttoftft	Female	32	0.3895199	0.018050156	0.003190847
	Male	35	0.38966186	0.017926128	0.003030069
nproverASB	Female	22	0.5824683	0.071188268	0.01517739
	Male	18	0.64451808	0.172630743	0.040689456
pararcoversagarc	Female	26	0.34385973	0.014683856	0.002879741
	Male	13	0.34956418	0.012673502	0.003514997
eyecircoversagarc	Female	19	0.3157903	0.014993871	0.00343983
	Male	9	0.32225574	0.018128197	0.006042732
ftftoverbl	Female	29	0.8611273	0.059804594	0.011105434
	Male	28	0.84256097	0.065524955	0.012383053
ftftoverecm	Female	26	1.68173451	0.186106781	0.036498543
	Male	34	1.62710962	0.110009589	0.018866489
nproverzyzy	Female	20	0.52410912	0.036525284	0.008167302
	Male	18	0.54471807	0.04231193	0.009973018
nproverftft	Female	26	0.64193256	0.076594895	0.015021495
	Male	31	0.6499456	0.076696423	0.013775084
nproeverfmt	Female	26	0.65381121	0.077875299	0.015272603
	Male	30	0.66195631	0.075256114	0.013739824
nproverdfmt	Female	30	1.63389704	0.175196301	0.031986322
	Male	33	1.65812494	0.177191384	0.030845061
nproverecec	Female	24	0.68111309	0.078298885	0.015982693
	Male	29	0.68617535	0.081818793	0.015193369
nprovernb	Female	29	0.57962102	0.054647875	0.010147856
	Male	24	0.57364349	0.068416289	0.013965416
nprovereyecirc	Female	23	0.54383385	0.048696812	0.010153987
	Male	29	0.54249724	0.064153934	0.011913086
nproverFroBCho	Female	22	0.60911631	0.054643398	0.011650012
	Male	26	0.64073367	0.1199507	0.023524268
nproverParHArc	Female	27	0.49174327	0.066317366	0.012762783
	Male	27	0.48822784	0.065080687	0.012524784
ftftoverGOP	Female	26	0.55023528	0.027230182	0.005340278
	Male	20	0.55108991	0.040695917	0.009099884
ftftoverbapr	Female	22	1.18938759	0.442731934	0.094390765
	Male	15	1.05930509	0.067525873	0.017435105
ftftoverpralv	Female	27	2.10052677	0.30557576	0.058808083
	Male	33	2.15528094	0.262946902	0.04577318
ftftoverdec	Female	30	2.52810106	0.145395341	0.026545436
	Male	33	2.55125697	0.139518987	0.024287138
ftftoverdfmt	Female	32	2.57264308	0.120202116	0.021248933
	Male	35	2.57160418	0.118378927	0.020009691
ftftoverMOW	Female	26	1.9399263	0.178106956	0.034929648
	Male	30	1.96663459	0.237111466	0.043290433
ftftovercirc	Female	24	0.19352414	0.010686475	0.002181368
	Male	18	0.19482524	0.014747236	0.003475957

	SEXCODE	N	Mean	Std. Deviation	Std. Error Mean
ftftovereyecirc	Female	24	0.83917135	0.044051214	0.008991916
	Male	28	0.83471391	0.07804699	0.014749495
ftftoverParHArc	Female	29	0.76495366	0.055010767	0.010215243
	Male	28	0.74962462	0.064175821	0.01212809
nnsovereyecirc	Female	25	0.39803793	0.044493217	0.008898643
	Male	29	0.39678002	0.05112563	0.009493791

Table 10: Levene's Test for Equality of Variances and Independent Samples t-tests for Equality of Means for Males and Females

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
gop	Equal variances assumed	2.835	0.098	-2.597	50	0.012	-7.8136	3.0092	-13.8579	-1.7694
	Equal variances not assumed			-2.51	39.217	0.016	-7.8136	3.1129	-14.109	-1.5183
eueu	Equal variances assumed	0.119	0.732	-1.895	45	0.065	-3.9417	2.08	-8.1309	0.2476
	Equal variances not assumed			-1.881	39.929	0.067	-3.9417	2.0955	-8.1771	0.2938
zyzy	Equal variances assumed	0.477	0.494	-3.345	38	0.002	-10.2727	3.0712	-16.49	-4.0555
	Equal variances not assumed			-3.428	37.949	0.001	-10.2727	2.997	-16.3401	-4.2054
bab	Equal variances assumed	0.093	0.761	-2.02	43	0.05	-7.13086	3.52997	-14.24972	-0.012
	Equal variances not assumed			-2.366	42.989	0.023	-7.13086	3.01393	-13.20908	-1.05264
ban	Equal variances assumed	0.412	0.524	-2.499	44	0.016	-7.443184584	2.978779367	-13.44651993	-1.439849237
	Equal variances not assumed			-2.839	43.97	0.007	-7.443184584	2.621635506	-12.72684717	-2.159521996
bapr	Equal variances assumed	2.072	0.158	-2.328	39	0.025	-10.1261875	4.349248166	-18.92337227	-1.329002726
	Equal variances not assumed			-2.647	37.872	0.012	-10.1261875	3.825673725	-17.87171647	-2.38065853
ecmecm	Equal variances assumed	2.53	0.117	-0.898	59	0.373	-1.777053377	1.979039512	-5.737102294	2.18299554
	Equal variances not assumed			-0.915	58.706	0.364	-1.777053377	1.941942152	-5.663278405	2.109171651
pralv	Equal variances assumed	2.044	0.158	0.345	64	0.732	0.744460829	2.160680575	-3.571994829	5.060916488
	Equal variances not assumed			0.348	63.845	0.729	0.744460829	2.138045003	-3.526974728	5.015896387
AUB	Equal variances assumed	0.022	0.883	-2.636	44	0.012	-7.223664717	2.74066822	-12.74711858	-1.700210855
	Equal variances not assumed			-2.628	38.506	0.012	-7.223664717	2.748589199	-12.78549101	-1.661838429

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
npr	Equal variances assumed	4.542	0.037	-0.704	61	0.484	-1.705545455	2.420968012	-6.546570189	3.13547928
	Equal variances not assumed			-0.713	59.333	0.478	-1.705545455	2.390523118	-6.488409387	3.077318478
ftft	Equal variances assumed	9.007	0.004	0.207	64	0.837	0.367729779	1.776823676	-3.181883569	3.917343128
	Equal variances not assumed			0.209	57.712	0.835	0.367729779	1.755776547	-3.147212156	3.882671715
fmtfmt	Equal variances assumed	12.618	0.001	0.042	65	0.967	0.106022321	2.5215408	-4.929842398	5.141887041
	Equal variances not assumed			0.043	59.742	0.966	0.106022321	2.47819544	-4.851547623	5.063592266
nns	Equal variances assumed	5.073	0.028	-0.49	67	0.626	-0.894844538	1.825316952	-4.538192423	2.748503347
	Equal variances not assumed			-0.489	62.783	0.627	-0.894844538	1.831517394	-4.55508758	2.765398505
alal	Equal variances assumed	1.92	0.171	0.578	57	0.565	0.474324009	0.820133625	-1.167965246	2.116613265
	Equal variances not assumed			0.586	56.09	0.56	0.474324009	0.808819001	-1.14587777	2.094525788
decleft	Equal variances assumed	7.206	0.009	0.547	62	0.586	0.511558824	0.934679479	-1.356838833	2.37995648
	Equal variances not assumed			0.562	57.114	0.576	0.511558824	0.91067451	-1.311956395	2.335074042
decright	Equal variances assumed	15.115	0	0.034	66	0.973	0.029844156	0.87125298	-1.709668544	1.769356855
	Equal variances not assumed			0.034	47.539	0.973	0.029844156	0.886296245	-1.7526204	1.812308712
decavg	Equal variances assumed	11.046	0.001	0.262	70	0.794	0.2228861	0.85067609	-1.473733864	1.919506065
	Equal variances not assumed			0.259	54.92	0.797	0.2228861	0.862114569	-1.504886399	1.950658599
dfmtleft	Equal variances assumed	11.731	0.001	-0.067	70	0.947	-0.059166023	0.883610656	-1.821471908	1.703139862
	Equal variances not assumed			-0.068	59.391	0.946	-0.059166023	0.871917418	-1.803628277	1.68529623
dfmtright	Equal variances assumed	13.057	0.001	-0.18	72	0.858	-0.154627193	0.860538869	-1.870080077	1.560825691
	Equal variances not assumed			-0.177	56.875	0.86	-0.154627193	0.871620418	-1.900099924	1.590845538
dfmtavg	Equal variances assumed	12.905	0.001	-0.129	74	0.898	-0.107702703	0.836710793	-1.774885351	1.559479945
	Equal variances not assumed			-0.127	57.68	0.899	-0.107702703	0.847603059	-1.804565083	1.589159678
OBHleft	Equal variances assumed	2.018	0.16	0.857	64	0.394	0.530333333	0.618611553	-0.70548531	1.766151977
	Equal variances not assumed			0.873	63.991	0.386	0.530333333	0.607611648	-0.683513623	1.74418029

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
OBHright	Equal variances assumed	0.022	0.881	0.397	68	0.692	0.234542484	0.590484428	-0.943750848	1.412835815
	Equal variances not assumed			0.398	67.95	0.692	0.234542484	0.589954658	-0.942709285	1.411794252
OBHavg	Equal variances assumed	0.121	0.729	0.533	71	0.596	0.314191066	0.589874528	-0.861985337	1.49036747
	Equal variances not assumed			0.532	70.839	0.596	0.314191066	0.590037175	-0.86235589	1.490738023
ecec	Equal variances assumed	8.969	0.004	-0.01	56	0.992	-0.021989247	2.255348483	-4.539995163	4.496016669
	Equal variances not assumed			-0.01	50.176	0.992	-0.021989247	2.182631621	-4.405553144	4.361574649
dd	Equal variances assumed	0.298	0.587	-0.175	66	0.862	-0.147320346	0.842229514	-1.828885827	1.534245134
	Equal variances not assumed			-0.175	65.908	0.862	-0.147320346	0.841667102	-1.827806723	1.533166031
nb	Equal variances assumed	3.008	0.088	-1.576	62	0.12	-3.159665992	2.004581161	-7.166766637	0.847434653
	Equal variances not assumed			-1.508	45.333	0.138	-3.159665992	2.094992921	-7.37834301	1.059011026
bl	Equal variances assumed	4.106	0.047	-1.917	64	0.06	-3.530111111	1.841453874	-7.208838123	0.148615901
	Equal variances not assumed			-1.877	54.85	0.066	-3.530111111	1.88072991	-7.299409494	0.239187272
lo	Equal variances assumed	0.405	0.527	-0.988	58	0.327	-1.4294	1.447000731	-4.325886663	1.467086663
	Equal variances not assumed			-0.973	48.979	0.335	-1.4294	1.468582746	-4.380659395	1.521859395
bao	Equal variances assumed	0.912	0.344	-2.848	53	0.006	-2.259327446	0.793165379	-3.850215728	-0.668439163
	Equal variances not assumed			-3.013	52.99	0.004	-2.259327446	0.749838242	-3.763319174	-0.755335718
FOB	Equal variances assumed	3.836	0.056	-0.796	52	0.43	-0.612289655	0.769551452	-2.156507618	0.931928308
	Equal variances not assumed			-0.779	43.849	0.44	-0.612289655	0.786379473	-2.1972874	0.97270809
ASB	Equal variances assumed	6.51	0.014	0.289	44	0.774	0.850846154	2.940524974	-5.07539253	6.777084838
	Equal variances not assumed			0.262	23.596	0.795	0.850846154	3.242555972	-5.847523446	7.549215753
ZMB	Equal variances assumed	5.824	0.019	0.62	55	0.538	1.54263125	2.488272975	-3.443979224	6.529241724
	Equal variances not assumed			0.647	54.398	0.52	1.54263125	2.383345158	-3.234887386	6.320149886
MOW	Equal variances assumed	2.191	0.145	0.502	54	0.618	1.057166667	2.105575492	-3.164258026	5.278591359
	Equal variances not assumed			0.512	53.216	0.611	1.057166667	2.065699148	-3.085708371	5.200041704

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Circ	Equal variances assumed	1.135	0.293	-3.253	42	0.002	-22.5274	6.9255	-36.5036	-8.5511
	Equal variances not assumed			-3.218	37.255	0.003	-22.5274	6.9996	-36.7066	-8.3481
SagittalArc	Equal variances assumed	3.872	0.056	-2.163	38	0.037	-13.6282	6.3005	-26.3829	-0.8735
	Equal variances not assumed			-1.915	17.948	0.072	-13.6282	7.1171	-28.5838	1.3274
FroHArc	Equal variances assumed	2.97	0.091	-1.445	53	0.154	-3.5959	2.4887	-8.5876	1.3957
	Equal variances not assumed			-1.341	33.059	0.189	-3.5959	2.6811	-9.0503	1.8584
ParHArc	Equal variances assumed	3.421	0.069	-2.586	63	0.012	-5.231	2.0226	-9.2728	-1.1891
	Equal variances not assumed			-2.544	55.726	0.014	-5.231	2.0558	-9.3497	-1.1122
OccipHArc	Equal variances assumed	2.047	0.159	-0.543	52	0.59	-1.3225	2.4362	-6.2111	3.5661
	Equal variances not assumed			-0.517	36.138	0.608	-1.3225	2.5557	-6.505	3.86
LEyeCirc	Equal variances assumed	11.72	0.001	-0.196	60	0.845	-0.4948	2.5199	-5.5353	4.5457
	Equal variances not assumed			-0.2	49.624	0.843	-0.4948	2.4777	-5.4724	4.4828
REyeCirc	Equal variances assumed	8.723	0.004	-0.381	61	0.704	-1.0716	2.8092	-6.6889	4.5457
	Equal variances not assumed			-0.378	42.682	0.708	-1.0716	2.8378	-6.7959	4.6527
EyeCircAvg	Equal variances assumed	10.015	0.003	-0.5	52	0.619	-1.2769	2.55533	-6.40454	3.85074
	Equal variances not assumed			-0.523	42.673	0.604	-1.2769	2.44342	-6.20561	3.65182
OccipArc	Equal variances assumed	0.074	0.787	-1.291	43	0.204	-2.96	2.2925	-7.5833	1.6633
	Equal variances not assumed			-1.29	40.777	0.204	-2.96	2.2937	-7.593	1.673
ParHArcleft	Equal variances assumed	1.066	0.306	0.48	58	0.633	1.2171	2.5372	-3.8617	6.296
	Equal variances not assumed			0.434	32.964	0.667	1.2171	2.8039	-4.4876	6.9219
ParHArcright	Equal variances assumed	0.12	0.73	0.486	55	0.629	1.2879	2.6479	-4.0187	6.5945
	Equal variances not assumed			0.446	33.146	0.658	1.2879	2.8859	-4.5826	7.1583
ParHCholeft	Equal variances assumed	3.087	0.084	0.322	57	0.748	0.63752381	1.978527317	-3.324408803	4.599456422
	Equal variances not assumed			0.28	28.065	0.781	0.63752381	2.273246317	-4.018524995	5.293572614
ParHChoright	Equal variances assumed	0.237	0.628	0.261	56	0.795	0.528351515	2.026514871	-3.531245592	4.587948622
	Equal variances not assumed			0.24	33.459	0.812	0.528351515	2.200861931	-3.947005588	5.003708619

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
ParBArcleft	Equal variances assumed	5.722	0.02	-0.74	56	0.462	-2.2941	3.1008	-8.5057	3.9174
	Equal variances not assumed			-0.658	29.697	0.515	-2.2941	3.4842	-9.4129	4.8247
ParBArcright	Equal variances assumed	3.836	0.055	-0.607	57	0.546	-1.7723	2.9186	-7.6167	4.0721
	Equal variances not assumed			-0.522	27.6	0.606	-1.7723	3.398	-8.7374	5.1927
ParBCholeft	Equal variances assumed	7.688	0.007	-0.741	57	0.462	-1.923594118	2.59652238	-7.123040498	3.275852263
	Equal variances not assumed			-0.666	30.801	0.51	-1.923594118	2.886418194	-7.812022499	3.964834264
ParBChoright	Equal variances assumed	6.375	0.014	-0.716	56	0.477	-1.799772727	2.515304264	-6.838532649	3.238987194
	Equal variances not assumed			-0.596	24.977	0.557	-1.799772727	3.020738122	-8.02138406	4.421838605
FroBCho	Equal variances assumed	5.192	0.027	0.156	53	0.876	0.4927	3.1503	-5.8259	6.8113
	Equal variances not assumed			0.155	40.964	0.878	0.4927	3.1801	-5.9299	6.9153
ftftoverzyzy	Equal variances assumed	2.085	0.158	1.236	35	0.225	0.027584978	0.022322079	-0.017731252	0.072901207
	Equal variances not assumed			1.338	31.447	0.19	0.027584978	0.020611065	-0.014427359	0.069597315
ftftoverAUB	Equal variances assumed	0.272	0.605	0.73	41	0.469	0.014042477	0.019227632	-0.024788513	0.052873467
	Equal variances not assumed			0.775	40.067	0.443	0.014042477	0.018123704	-0.022584994	0.050669949
ftftoverecec	Equal variances assumed	1.395	0.243	-0.165	55	0.869	-0.002272093	0.013762825	-0.029853411	0.025309225
	Equal variances not assumed			-0.163	50.04	0.871	-0.002272093	0.013918675	-0.030228026	0.025683839
nnsovergop	Equal variances assumed	0.727	0.398	-0.788	48	0.434	-0.006825517	0.008659614	-0.024236838	0.010585804
	Equal variances not assumed			-0.775	40.549	0.443	-0.006825517	0.008802411	-0.024608351	0.010957317
nnsovereueu	Equal variances assumed	0.063	0.803	-0.867	44	0.391	-0.011750947	0.013555789	-0.039070844	0.01556895
	Equal variances not assumed			-0.858	39.414	0.396	-0.011750947	0.013688573	-0.039429409	0.015927514
nnsovercirc	Equal variances assumed	0.153	0.698	-0.769	41	0.446	-0.002598728	0.003379564	-0.009423896	0.004226441
	Equal variances not assumed			-0.764	37.782	0.45	-0.002598728	0.003400744	-0.009484476	0.00428702
ececoverzyzy	Equal variances assumed	0.966	0.332	1.007	36	0.321	0.01304936	0.012962608	-0.013240028	0.039338748
	Equal variances not assumed			1.056	33.974	0.298	0.01304936	0.012356899	-0.012063581	0.0381623

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
ececoverbapr	Equal variances assumed	2.341	0.135	1.205	34	0.236	0.032040582	0.026584485	-0.02198559	0.086066755
	Equal variances not assumed			1.288	33.87	0.206	0.032040582	0.02486998	-0.018508444	0.082589609
ececoverdd	Equal variances assumed	0.795	0.376	-0.06	56	0.953	-0.008730462	0.146184192	-0.301572588	0.284111665
	Equal variances not assumed			-0.059	53.384	0.953	-0.008730462	0.147020468	-0.303566694	0.286105771
ddoverftft	Equal variances assumed	0.031	0.86	-0.082	65	0.935	-0.000491411	0.005962863	-0.01240007	0.011417248
	Equal variances not assumed			-0.082	63.785	0.935	-0.000491411	0.00597565	-0.012429919	0.011447097
ddoverMOW	Equal variances assumed	0.298	0.587	-0.305	54	0.761	-0.004109999	0.013469302	-0.031114324	0.022894325
	Equal variances not assumed			-0.308	53.921	0.76	-0.004109999	0.013364799	-0.030905706	0.022685708
CircoverGOP	Equal variances assumed	0.601	0.443	1.098	41	0.279	0.02201428	0.02004924	-0.018475982	0.062504541
	Equal variances not assumed			1.132	40.983	0.264	0.02201428	0.019450774	-0.017267864	0.061296424
fmtoverLeyecirc	Equal variances assumed	2.25	0.139	0.041	57	0.967	0.000447057	0.010921803	-0.021423477	0.022317591
	Equal variances not assumed			0.041	51.85	0.968	0.000447057	0.010975063	-0.021577534	0.022471648
dfmtavgoverbab	Equal variances assumed	0.611	0.439	-0.034	43	0.973	-0.000457318	0.013384912	-0.027450566	0.02653593
	Equal variances not assumed			-0.043	39.452	0.966	-0.000457318	0.010696817	-0.022085748	0.021171112
dfmtavgoverAUB	Equal variances assumed	0.002	0.968	-0.463	44	0.645	-0.002992397	0.00645832	-0.016008285	0.010023491
	Equal variances not assumed			-0.469	40.438	0.642	-0.002992397	0.006383968	-0.015890531	0.009905736
dfmtavgoverftft	Equal variances assumed	0.011	0.915	-0.032	65	0.974	-0.000141962	0.004398941	-0.008927254	0.00864333
	Equal variances not assumed			-0.032	64.383	0.974	-0.000141962	0.00440032	-0.008931606	0.008647682
dfmtavgoverecec	Equal variances assumed	0.619	0.435	0.363	56	0.718	0.001603146	0.004415598	-0.007242359	0.010448652
	Equal variances not assumed			0.365	55.831	0.716	0.001603146	0.004389194	-0.007190052	0.010396345
dfmtavgovercirc	Equal variances assumed	0.262	0.612	-0.891	42	0.378	-0.001250284	0.001403018	-0.004081689	0.001581121
	Equal variances not assumed			-0.874	35.837	0.388	-0.001250284	0.001429963	-0.004150841	0.001650274
nprovergop	Equal variances assumed	0.218	0.643	-1.221	45	0.228	-0.012784063	0.010470057	-0.033871839	0.008303714
	Equal variances not assumed			-1.214	40.2	0.232	-0.012784063	0.010530652	-0.034064007	0.008495882
nprovereueu	Equal variances assumed	0.066	0.799	-0.976	40	0.335	-0.017775808	0.018217203	-0.054594149	0.019042532
	Equal variances not assumed			-0.966	36.66	0.341	-0.017775808	0.018408823	-0.055087325	0.019535708

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
eyecircovercirc	Equal variances assumed	1.448	0.237	-0.593	35	0.557	-0.00274759	0.004630628	-0.012148264	0.006653085
	Equal variances not assumed			-0.56	24.103	0.581	-0.00274759	0.004907714	-0.012874334	0.007379155
dfmtoverzyzy	Equal variances assumed	0.676	0.416	0.427	38	0.672	0.002804997	0.006567763	-0.010490743	0.016100737
	Equal variances not assumed			0.442	37.185	0.661	0.002804997	0.006340177	-0.010039263	0.015649257
nproversagarc	Equal variances assumed	0.57	0.456	-0.454	34	0.653	-0.003336683	0.007352435	-0.018278628	0.011605262
	Equal variances not assumed			-0.435	19.828	0.668	-0.003336683	0.007669082	-0.019343012	0.012669647
nprovercirc	Equal variances assumed	0.263	0.611	-1.001	37	0.323	-0.004147448	0.004143057	-0.012542078	0.004247183
	Equal variances not assumed			-0.997	35.449	0.326	-0.004147448	0.004159777	-0.012588422	0.004293527
eyecircoverecec	Equal variances assumed	1.216	0.275	-0.24	50	0.812	-0.005212829	0.021760238	-0.048919553	0.038493896
	Equal variances not assumed			-0.248	45.31	0.805	-0.005212829	0.020983577	-0.047467941	0.037042284
nproverAUB	Equal variances assumed	0.049	0.826	-1.549	39	0.13	-0.023727607	0.015321126	-0.054717509	0.007262296
	Equal variances not assumed			-1.535	35.318	0.134	-0.023727607	0.015459247	-0.055101445	0.007646231
dfmtovereyecircavg	Equal variances assumed	2.248	0.14	-0.083	52	0.934	-0.000501929	0.006065622	-0.012673489	0.011669632
	Equal variances not assumed			-0.088	33.909	0.93	-0.000501929	0.005697251	-0.012081276	0.011077418
dfmtoverAUB	Equal variances assumed	0.002	0.968	-0.463	44	0.645	-0.002992397	0.00645832	-0.016008285	0.010023491
	Equal variances not assumed			-0.469	40.438	0.642	-0.002992397	0.006383968	-0.015890531	0.009905736
eyecircoverAUB	Equal variances assumed	0.886	0.353	0.08	37	0.937	0.001613265	0.020146187	-0.039206788	0.042433317
	Equal variances not assumed			0.075	23.986	0.941	0.001613265	0.021535944	-0.042836111	0.04606264
ftftoverZMB	Equal variances assumed	0.485	0.489	-1.14	55	0.259	-0.019945145	0.017492054	-0.055000004	0.015109714
	Equal variances not assumed			-1.133	50.461	0.262	-0.019945145	0.017598239	-0.055284242	0.015393952
ftftoverFroBCho	Equal variances assumed	2.745	0.104	-1.069	52	0.29	-0.045722039	0.042782684	-0.131571775	0.040127697
	Equal variances not assumed			-1.034	27.904	0.31	-0.045722039	0.044232815	-0.136342826	0.044898749
eyecircoverfmt	Equal variances assumed	0.369	0.546	-0.257	50	0.798	-0.004935454	0.019170457	-0.04344045	0.033569543
	Equal variances not assumed			-0.264	48.328	0.793	-0.004935454	0.018672546	-0.042472548	0.032601641

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
dfmttoftft	Equal variances assumed	0.011	0.915	-0.032	65	0.974	-0.000141962	0.004398941	-0.008927254	0.00864333
	Equal variances not assumed			-0.032	64.383	0.974	-0.000141962	0.00440032	-0.008931606	0.008647682
nproverASB	Equal variances assumed	0.661	0.421	-1.537	38	0.133	-0.062049782	0.040368008	-0.143770541	0.019670977
	Equal variances not assumed			-1.429	21.719	0.167	-0.062049782	0.043427929	-0.15218134	0.028081777
pararcoversagarc	Equal variances assumed	0.606	0.441	-1.194	37	0.24	-0.005704446	0.00477709	-0.01538375	0.003974859
	Equal variances not assumed			-1.255	27.556	0.22	-0.005704446	0.00454402	-0.015019206	0.003610315
eyecircoversagarc	Equal variances assumed	0.837	0.369	-0.997	26	0.328	-0.006465444	0.006484016	-0.01979353	0.006862643
	Equal variances not assumed			-0.93	13.399	0.369	-0.006465444	0.006953204	-0.021441533	0.008510646
ftftoverbl	Equal variances assumed	0.834	0.365	1.118	55	0.268	0.018566338	0.016606375	-0.014713581	0.051846257
	Equal variances not assumed			1.116	54.131	0.269	0.018566338	0.01663342	-0.014779807	0.051912483
ftftoverecm	Equal variances assumed	1.471	0.23	1.42	58	0.161	0.054624887	0.038479188	-0.022399575	0.13164935
	Equal variances not assumed			1.33	38.085	0.192	0.054624887	0.041086348	-0.028543994	0.137793768
nproverzyzy	Equal variances assumed	0.998	0.324	-1.611	36	0.116	-0.02060895	0.012789098	-0.046546443	0.005328544
	Equal variances not assumed			-1.599	33.833	0.119	-0.02060895	0.012890535	-0.046810431	0.005592531
nproverftft	Equal variances assumed	0.127	0.723	-0.393	55	0.696	-0.008013034	0.020383733	-0.048862947	0.032836879
	Equal variances not assumed			-0.393	53.31	0.696	-0.008013034	0.020381321	-0.048887239	0.032861172
nproeverfmt	Equal variances assumed	0.355	0.554	-0.397	54	0.693	-0.008145099	0.020492443	-0.049229974	0.032939777
	Equal variances not assumed			-0.396	52.306	0.693	-0.008145099	0.020543494	-0.049362887	0.03307269
nproverdfmt	Equal variances assumed	0.121	0.729	-0.545	61	0.588	-0.024227897	0.044460184	-0.113131529	0.064675735
	Equal variances not assumed			-0.545	60.556	0.588	-0.024227897	0.044435825	-0.11309599	0.064640196
nproverecec	Equal variances assumed	0.326	0.571	-0.229	51	0.82	-0.005062255	0.022145274	-0.049520748	0.039396237
	Equal variances not assumed			-0.23	49.887	0.819	-0.005062255	0.022051869	-0.049357222	0.039232712
nprovernb	Equal variances assumed	2.841	0.098	0.354	51	0.725	0.005977534	0.016899727	-0.027950083	0.039905151
	Equal variances not assumed			0.346	43.694	0.731	0.005977534	0.017263019	-0.028820672	0.04077574
nprovereyecirc	Equal variances assumed	2.005	0.163	0.083	50	0.934	0.001336605	0.016156429	-0.031114538	0.033787747
	Equal variances not assumed			0.085	49.925	0.932	0.001336605	0.015653277	-0.030105095	0.032778304

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
nproverFroBCho	Equal variances assumed	0.819	0.37	-1.139	46	0.261	-0.031617364	0.027759385	-0.087494109	0.024259381
	Equal variances not assumed			-1.204	36.176	0.236	-0.031617364	0.02625098	-0.084847822	0.021613093
nproverParHArc	Equal variances assumed	0.023	0.881	0.197	52	0.845	0.003515436	0.017881802	-0.032367025	0.039397897
	Equal variances not assumed			0.197	51.982	0.845	0.003515436	0.017881802	-0.032367328	0.039398199
ftftoverGOP	Equal variances assumed	5.295	0.026	-0.085	44	0.932	-0.000854624	0.010026597	-0.021061903	0.019352654
	Equal variances not assumed			-0.081	31.501	0.936	-0.000854624	0.010551135	-0.022359944	0.020650695
ftftoverbapr	Equal variances assumed	2.085	0.158	1.124	35	0.269	0.130082504	0.115718322	-0.10483818	0.365003188
	Equal variances not assumed			1.355	22.418	0.189	0.130082504	0.095987497	-0.068768256	0.328933264
ftftoverpralv	Equal variances assumed	0.111	0.74	-0.746	58	0.459	-0.054754166	0.073399993	-0.201680215	0.092171883
	Equal variances not assumed			-0.735	51.645	0.466	-0.054754166	0.074522309	-0.204318609	0.094810277
ftftoverdec	Equal variances assumed	0.067	0.797	-0.645	61	0.521	-0.023155901	0.035907779	-0.094957942	0.048646141
	Equal variances not assumed			-0.644	59.86	0.522	-0.023155901	0.035979512	-0.095129111	0.04881731
ftftoverdfmt	Equal variances assumed	0.009	0.923	0.036	65	0.972	0.001038893	0.029167136	-0.0572119	0.059289685
	Equal variances not assumed			0.036	64.274	0.972	0.001038893	0.029187409	-0.057264875	0.05934266
ftftoverMOW	Equal variances assumed	0.837	0.364	-0.471	54	0.64	-0.02670829	0.056763618	-0.140512492	0.087095912
	Equal variances not assumed			-0.48	52.996	0.633	-0.02670829	0.055625011	-0.138278148	0.084861568
ftftovercirc	Equal variances assumed	2.671	0.11	-0.332	40	0.742	-0.001301099	0.003920502	-0.009224728	0.00662253
	Equal variances not assumed			-0.317	29.63	0.753	-0.001301099	0.004103735	-0.009686433	0.007084235
ftftovereyecirc	Equal variances assumed	0.802	0.375	0.248	50	0.805	0.004457437	0.017988985	-0.031674503	0.040589377
	Equal variances not assumed			0.258	43.711	0.798	0.004457437	0.017274321	-0.030363164	0.039278037
ftftoverParHArc	Equal variances assumed	1.941	0.169	0.969	55	0.337	0.015329045	0.015813666	-0.016362251	0.04702034
	Equal variances not assumed			0.967	53.119	0.338	0.015329045	0.015856915	-0.01647424	0.047132329
nnsovereyecirc	Equal variances assumed	0.301	0.586	0.096	52	0.924	0.001257903	0.013148542	-0.025126577	0.027642383
	Equal variances not assumed			0.097	51.992	0.923	0.001257903	0.013012222	-0.024853125	0.027368931

Appendix 10: Results of Independent Samples T-Tests for Differences between Blacks and Whites for the Variables and Ratios.

Table 11: Descriptive Statistics for Blacks and Whites

Group Statistics					
	Ancestry	N	Mean	Std. Deviation	Std. Error Mean
gop	B	28	171.482	12.7494	2.4094
	W	24	171.75	9.6279	1.9653
eueu	B	23	132.239	7.0467	1.4693
	W	24	133.75	7.5065	1.5323
zyzy	B	23	116.391	12.0019	2.5026
	W	17	119.824	9.0449	2.1937
bab	B	22	124.9014	7.32632	1.56198
	W	23	125.1522	14.95633	3.11861
ban	B	24	92.3677083	7.925208539	1.6177264
	W	22	91.8729545	12.59364339	2.6849738
bapr	B	22	90.995	11.55944254	2.4644814
	W	19	85.6384211	16.83104944	3.8613076
ecmecm	B	30	56.2768333	9.173513831	1.6748468
	W	31	54.79	5.918688762	1.0630279
pralv	B	35	44.8614286	9.170024342	1.550017
	W	31	43.4516129	8.22449435	1.4771628
AUB	B	24	109.772708	10.48867536	2.1409919
	W	22	113.096591	8.757532321	1.8671122
npr	B	33	57.8424242	10.02336132	1.7448432
	W	30	61.1918333	8.852665046	1.6162681
ftft	B	31	88.8472581	7.115406973	1.2779648
	W	35	88.0452857	7.283390042	1.2311176
fmtfmt	B	32	92.9307813	10.35741266	1.8309492
	W	35	90.1214286	10.07512207	1.7030065
nns	B	37	41.6551351	7.630589253	1.2544611
	W	32	44.8582813	7.165143968	1.2666305
alal	B	29	21.3796552	3.546930748	0.6586485
	W	30	20.0923333	2.519710825	0.4600342
decleft	B	34	35.9452941	4.060597422	0.6963867
	W	30	36.4091667	3.32116439	0.6063589
decright	B	37	36.0390541	3.661370007	0.6019255
	W	31	36.8595161	3.449689927	0.6195826
decavg	B	39	35.8847436	3.755941863	0.601432
	W	33	36.4796212	3.398498584	0.5916027
dfmtleft	B	37	35.5681081	4.06328178	0.6679994
	W	35	35.008	3.356553555	0.5673611
dfmtright	B	39	35.8260256	3.748877407	0.6003008
	W	35	35.3397143	3.628668923	0.613357
dfmtavg	B	40	35.7279375	3.800967652	0.6009858
	W	36	35.1304861	3.437806393	0.5729677
OBHleft	B	34	33.4857353	2.585559002	0.4434197
	W	32	33.1340625	2.427831715	0.4291841

	Ancestry	N	Mean	Std. Deviation	Std. Error Mean
OBHright	B	37	33.1786486	2.490782075	0.4094821
	W	33	32.7283333	2.428101968	0.4226783
OBHavg	B	39	33.2214103	2.571349725	0.4117455
	W	34	32.8301471	2.452857019	0.4206615
ecec	B	30	88.351	8.764100697	1.6000985
	W	28	86.1016071	8.187445228	1.5472817
dd	B	33	20.284697	3.522018007	0.6131046
	W	35	18.1485714	3.073221526	0.5194692
nb	B	31	101.906774	8.238046041	1.4795967
	W	33	102.512576	7.82294483	1.3617999
bl	B	35	110.330857	8.225837387	1.3904203
	W	31	106.243387	6.271419481	1.1263802
lo	B	33	91.020303	5.886118195	1.0246417
	W	27	91.712037	5.132931435	0.9878331
bao	B	30	33.8895	2.924903579	0.5340119
	W	25	35.5914	3.074782689	0.6149565
FOB	B	27	27.0738889	2.263693091	0.4356479
	W	27	29.7916667	2.671329617	0.5140976
ASB	B	23	101.628696	7.021984182	1.4641849
	W	23	104.13913	11.96911296	2.4957326
ZMB	B	27	79.2688889	10.02074121	1.9284925
	W	30	77.3131667	8.605641843	1.5711681
MOW	B	27	50.7335185	7.864465459	1.5135171
	W	29	44.3565517	6.473749204	1.202145
Circ	B	22	488.886	26.8292	5.72
	W	22	488.409	24.0107	5.1191
SagittalArc	B	15	352.267	23.665	6.1103
	W	25	351.46	17.1026	3.4205
FroHArc	B	24	119.042	9.8145	2.0034
	W	31	119.29	8.5885	1.5425
ParHArc	B	33	123.121	8.8477	1.5402
	W	32	119.219	7.7313	1.3667
OccipHArc	B	29	109.793	9.2529	1.7182
	W	25	109.06	8.1103	1.6221
LEyeCirc	B	32	110.594	10.5322	1.8618
	W	30	112.133	9.1491	1.6704
REyeCirc	B	34	110.765	10.4687	1.7954
	W	29	111.862	8.7738	1.6293
EyeCircAvg	B	38	110.6513	10.74262	1.74268
	W	33	111.3864	8.98264	1.56368

	Ancestry	N	Mean	Std. Deviation	Std. Error Mean
OccipArc	B	21	121.5	7.5233	1.6417
	W	24	126.479	7.2194	1.4736
ParHArcleft	B	30	118.333	7.2151	1.3173
	W	30	117.217	5.4515	0.9953
ParHArcright	B	28	119.143	6.4433	1.2177
	W	29	119.155	5.8326	1.0831
ParHArcAvg	B	32	118.6172	6.76625	1.19612
	W	33	118.0758	5.22669	0.90985
ParHCholeft	B	30	99.602	5.483105809	1.0010736
	W	29	99.1065517	3.888501388	0.7220766
ParHChoright	B	28	99.0457143	4.594168549	0.8682162
	W	30	100.688833	4.481700086	0.8182427
ParHChoaverage	B	32	99.244375	5.156797307	0.9116016
	W	33	99.6733333	3.79217377	0.6601327
ParBArcleft	B	28	130.446	9.3723	1.7712
	W	30	125.4	7.3172	1.3359
ParBArcright	B	28	130.107	9.0055	1.7019
	W	31	126.048	6.5642	1.179
ParBArcAvg	B	30	130.2417	9.18547	1.67703
	W	33	125.4015	6.78462	1.18105
ParBCholeft	B	28	112.870179	8.205902289	1.5507698
	W	31	109.695806	6.559969524	1.1782053
ParBChoright	B	28	110.789286	7.932306506	1.499065
	W	30	109.331333	5.824059482	1.0633229
ParBChoAvg	B	30	111.682333	8.012585411	1.4628913
	W	33	109.028333	6.148370772	1.070294
FroBCho	B	22	98.591	10.9682	2.3384
	W	33	97.576	10.0872	1.756
ftftoverzyzy	B	20	0.80726981	0.08627492	0.0192917
	W	17	0.77009308	0.026406032	0.0064044
ftftoverAUB	B	21	0.84247038	0.081728193	0.0178346
	W	22	0.81268413	0.026468624	0.0056431
ftftoverecec	B	29	1.0215127	0.057122144	0.0106073
	W	28	1.04327076	0.043037475	0.0081333
nnsovergop	B	27	0.25212782	0.03108804	0.0059829
	W	23	0.27833715	0.022104273	0.0046091
nnsovereueu	B	23	0.33376768	0.044864546	0.0093549
	W	23	0.34803913	0.045893568	0.0095695
nnsovercirc	B	22	0.09070011	0.011802108	0.0025162
	W	21	0.09731387	0.009062295	0.0019776

	Ancestry	N	Mean	Std. Deviation	Std. Error Mean
ececoverzyzy	B	21	0.79853828	0.040776312	0.0088981
	W	17	0.75181316	0.017073278	0.0041409
ececoverbapr	B	18	1.03330729	0.084461204	0.0199077
	W	18	1.00943779	0.073898085	0.0174179
ececoverdd	B	30	4.34820153	0.525851325	0.0960069
	W	28	4.7323787	0.513313524	0.0970071
ddoverftft	B	32	0.22026051	0.023578597	0.0041681
	W	35	0.20309203	0.022013359	0.0037209
ddoverMOW	B	27	0.4083	0.050070128	0.009636
	W	29	0.4123379	0.050455135	0.0093693
CircoverGOP	B	21	2.82629884	0.058515264	0.0127691
	W	22	2.84995305	0.070852189	0.0151057
fmtoverLeyecirc	B	29	0.81668435	0.048721493	0.0090474
	W	30	0.80971505	0.033774861	0.0061664
dfmtavgoverbab	B	22	0.30172638	0.01644979	0.0035071
	W	23	0.29895974	0.057866349	0.012066
dfmtavgoverAUB	B	24	0.34274857	0.021876484	0.0044655
	W	22	0.32624532	0.017502629	0.0037316
dfmtavgoverftft	B	32	0.38398799	0.016103623	0.0028467
	W	35	0.39471961	0.018037407	0.0030489
dfmtavgoverecec	B	30	0.4066763	0.01683455	0.0030736
	W	28	0.41659886	0.015091292	0.002852
dfmtavgovercirc	B	22	0.07711196	0.004634739	0.0009881
	W	22	0.07476198	0.00435097	0.0009276
nprovergop	B	25	0.34780566	0.037053995	0.0074108
	W	22	0.37413057	0.028861844	0.0061534
nprovereueu	B	20	0.46448764	0.053458016	0.0119536
	W	22	0.46896992	0.064327827	0.0137147
eyecircovercirc	B	22	0.23640414	0.013521298	0.0028828
	W	22	0.23382136	0.01207976	0.0025754
dfmtoverzyzy	B	23	0.32595754	0.022213838	0.0046319
	W	17	0.31159892	0.01465042	0.0035532
nproversagarc	B	14	0.1581144	0.020341715	0.0054366
	W	22	0.17685382	0.017470106	0.0037246
nprovercirc	B	19	0.12648717	0.013364546	0.003066
	W	20	0.13116296	0.01234227	0.0027598
eyecircoverecec	B	29	1.24954684	0.039013431	0.0072446
	W	27	1.30692734	0.064383061	0.0123905
nproverAUB	B	21	0.54704391	0.046902082	0.0102349
	W	20	0.57461688	0.049386356	0.0110431
dfmtovereyecircavg	B	38	0.32610776	0.010182446	0.0016518
	W	33	0.31964613	0.01282445	0.0022325

	Ancestry	N	Mean	Std. Deviation	Std. Error Mean
dfmtoverAUB	B	24	0.34274857	0.021876484	0.0044655
	W	22	0.32624532	0.017502629	0.0037316
eyecircoverAUB	B	24	1.04730384	0.059857099	0.0122183
	W	22	1.02123743	0.060081607	0.0128094
ftftoverZMB	B	27	1.19420152	0.060954444	0.0117307
	W	30	1.16872404	0.068467589	0.0125004
ftftoverFroBCho	B	21	0.98601952	0.045800477	0.0099945
	W	33	0.91233853	0.055402918	0.0096444
eyecircoverfmt	B	29	1.22944127	0.074186025	0.013776
	W	32	1.23853004	0.053267907	0.0094165
dfmttoftft	B	32	0.38398799	0.016103623	0.0028467
	W	35	0.39471961	0.018037407	0.0030489
nproverASB	B	19	0.58918895	0.070179563	0.0161003
	W	21	0.62957323	0.165263734	0.0360635
pararcoversagarc	B	15	0.35351655	0.012943615	0.003342
	W	24	0.34091413	0.012833827	0.0026197
eyecircoversagarc	B	14	0.31135335	0.017823294	0.0047635
	W	24	0.31785491	0.017685235	0.00361
ftftoverbl	B	27	0.86388153	0.060720265	0.0116856
	W	30	0.84131991	0.06375759	0.0116405
ftftoverecm	B	29	1.66013242	0.185141922	0.03438
	W	31	1.64203174	0.107167394	0.0192478
nproverzyzy	B	21	0.52304249	0.033630392	0.0073388
	W	17	0.54724796	0.044498722	0.0107925
nproverftft	B	27	0.61090846	0.068023882	0.0130912
	W	30	0.67813439	0.069360918	0.0126635
nproeverfmt	B	26	0.63953753	0.094064996	0.0184477
	W	30	0.67432683	0.052099321	0.009512
nproverdfmt	B	33	1.58786442	0.172636862	0.0300522
	W	30	1.71118361	0.156618514	0.0285945
nproverecec	B	27	0.64831933	0.072335605	0.013921
	W	26	0.7208145	0.07017952	0.0137633
nprovernb	B	25	0.56460741	0.069266042	0.0138532
	W	28	0.58790244	0.050710606	0.0095834
nprovereyecirc	B	33	0.51944289	0.056123151	0.0097698
	W	30	0.54643481	0.051097037	0.009329
nproverFroBCho	B	20	0.60536821	0.061093945	0.013661
	W	28	0.62042873	0.051060034	0.0096494
nproverParHArc	B	28	0.47373923	0.068781418	0.0129985
	W	26	0.5074816	0.057115457	0.0112013

	Ancestry	N	Mean	Std. Deviation	Std. Error Mean
ftftoverGOP	B	22	0.56312116	0.028061214	0.0059827
	W	24	0.53913541	0.034181504	0.0069773
ftftoverbapr	B	18	1.10209094	0.097308986	0.0229359
	W	19	1.16939297	0.478896815	0.1098665
ftftoverpralv		29	2.15272305	0.298087462	0.0553535
	W	31	2.10998469	0.268916669	0.0482989
ftftoverdec	B	31	2.61233014	0.131673571	0.0236493
	W	32	2.47038367	0.114578651	0.0202548
ftftoverdfmt	B	32	2.60882685	0.112886344	0.0199557
	W	35	2.53852188	0.114624142	0.019375
ftftoverMOW	B	27	1.86501796	0.155662198	0.0299572
	W	29	2.03729781	0.222680737	0.0413508
ftftovercirc	B	20	0.20003891	0.010794283	0.0024137
	W	22	0.18866616	0.011489969	0.0024497
ftftovereyecirc	B	30	0.84892002	0.034635549	0.0063236
	W	32	0.80695194	0.044577098	0.0078802
ftftoverParHArc	B	26	0.77109187	0.057100186	0.0111983
	W	31	0.7459599	0.060232608	0.0108181
nnsovereyecirc	B	37	0.37409525	0.042899277	0.0070526
	W	32	0.40182276	0.043814465	0.0077454

Table 12: Levene's Test for Equality of Variances and Independent Samples t-tests for Equality of Means for Blacks and Whites

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
gop	Equal variances assumed	1.563	0.217	-0.084	50	0.933	-0.2679	3.1767	-6.6485	6.1128
	Equal variances not assumed			-0.086	49.274	0.932	-0.2679	3.1093	-6.5153	5.9796
eueu	Equal variances assumed	0.046	0.831	-0.711	45	0.481	-1.5109	2.1258	-5.7925	2.7708
	Equal variances not assumed			-0.712	44.983	0.48	-1.5109	2.1229	-5.7867	2.765
zyzy	Equal variances assumed	2.471	0.124	-0.989	38	0.329	-3.4322	3.4721	-10.4611	3.5966
	Equal variances not assumed			-1.031	37.972	0.309	-3.4322	3.3279	-10.1695	3.305

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
bab	Equal variances assumed	0.077	0.783	-0.071	43	0.944	-0.25081	3.53685	-7.38355	6.88193
	Equal variances not assumed			-0.072	32.293	0.943	-0.25081	3.48791	-7.35292	6.8513
ban	Equal variances assumed	0.015	0.903	0.161	44	0.873	0.494754	3.074904	-5.70231	6.691815
	Equal variances not assumed			0.158	34.824	0.875	0.494754	3.134665	-5.8701	6.859611
bapr	Equal variances assumed	0.121	0.73	1.201	39	0.237	5.356579	4.458888	-3.66237	14.37553
	Equal variances not assumed			1.169	31.212	0.251	5.356579	4.58076	-3.98337	14.69652
ecmecm	Equal variances assumed	4.763	0.033	0.755	59	0.453	1.486833	1.970133	-2.45539	5.429061
	Equal variances not assumed			0.75	49.332	0.457	1.486833	1.983719	-2.49892	5.472586
pralv	Equal variances assumed	0.018	0.893	0.654	64	0.515	1.409816	2.155492	-2.89627	5.715905
	Equal variances not assumed			0.658	63.987	0.513	1.409816	2.141159	-2.86766	5.68729
AUB	Equal variances assumed	0.33	0.569	-1.161	44	0.252	-3.32388	2.863394	-9.09467	2.446909
	Equal variances not assumed			-1.17	43.641	0.248	-3.32388	2.840766	-9.0504	2.402636
npr	Equal variances assumed	0.799	0.375	-1.4	61	0.167	-3.34941	2.392668	-8.13385	1.435027
	Equal variances not assumed			-1.408	60.955	0.164	-3.34941	2.378403	-8.10539	1.406573
ftft	Equal variances assumed	0.194	0.661	0.451	64	0.653	0.801972	1.777048	-2.74809	4.352035
	Equal variances not assumed			0.452	63.366	0.653	0.801972	1.774498	-2.74368	4.347624
fmtfmt	Equal variances assumed	0.004	0.949	1.125	65	0.265	2.809353	2.497382	-2.17826	7.79697
	Equal variances not assumed			1.124	64.098	0.265	2.809353	2.500521	-2.18586	7.80457
nns	Equal variances assumed	0.347	0.558	-1.789	67	0.078	-3.20315	1.790961	-6.77792	0.371627
	Equal variances not assumed			-1.797	66.525	0.077	-3.20315	1.782702	-6.7619	0.355609
alal	Equal variances assumed	1.693	0.198	1.611	57	0.113	1.287322	0.79885	-0.31235	2.886991
	Equal variances not assumed			1.602	50.401	0.115	1.287322	0.803399	-0.32603	2.900677
decleft	Equal variances assumed	1.146	0.289	-0.496	62	0.622	-0.46387	0.935081	-2.33307	1.405327
	Equal variances not assumed			-0.502	61.67	0.617	-0.46387	0.923377	-2.30987	1.382129
decright	Equal variances assumed	0.069	0.794	-0.945	66	0.348	-0.82046	0.868441	-2.55436	0.913437
	Equal variances not assumed			-0.95	65.058	0.346	-0.82046	0.863827	-2.54561	0.90469
decavg	Equal variances assumed	0.198	0.658	-0.699	70	0.487	-0.59488	0.850768	-2.29168	1.101926
	Equal variances not assumed			-0.705	69.664	0.483	-0.59488	0.843632	-2.27759	1.087835
dfmtleft	Equal variances assumed	0.69	0.409	0.636	70	0.527	0.560108	0.881099	-1.19719	2.317405
	Equal variances not assumed			0.639	68.777	0.525	0.560108	0.876426	-1.18841	2.30863
dfmtright	Equal variances assumed	0.039	0.845	0.566	72	0.573	0.486311	0.859769	-1.22761	2.20023
	Equal variances not assumed			0.567	71.574	0.573	0.486311	0.858235	-1.22472	2.197346
dfmtavg	Equal variances assumed	0.134	0.715	0.716	74	0.476	0.597451	0.834792	-1.06591	2.26081
	Equal variances not assumed			0.72	73.997	0.474	0.597451	0.830347	-1.05705	2.251955
OBHleft	Equal variances assumed	0.164	0.687	0.569	64	0.572	0.351673	0.618301	-0.88353	1.586871
	Equal variances not assumed			0.57	64	0.571	0.351673	0.617106	-0.88114	1.584484
OBHright	Equal variances assumed	0.007	0.934	0.764	68	0.447	0.450315	0.58937	-0.72575	1.626386
	Equal variances not assumed			0.765	67.445	0.447	0.450315	0.5885	-0.72419	1.624824

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
OBHavg	Equal variances assumed	0.118	0.732	0.663	71	0.51	0.391263	0.590565	-0.78629	1.568816
	Equal variances not assumed			0.665	70.403	0.508	0.391263	0.588634	-0.78261	1.565139
ecec	Equal variances assumed	0.124	0.726	1.008	56	0.318	2.249393	2.231162	-2.22016	6.718948
	Equal variances not assumed			1.011	56	0.317	2.249393	2.225847	-2.20952	6.708301
dd	Equal variances assumed	1.04	0.312	2.669	66	0.01	2.136126	0.800339	0.538197	3.734054
	Equal variances not assumed			2.658	63.591	0.01	2.136126	0.803583	0.530585	3.741666
nb	Equal variances assumed	0.022	0.884	-0.302	62	0.764	-0.6058	2.007601	-4.61894	3.407335
	Equal variances not assumed			-0.301	61.189	0.764	-0.6058	2.010897	-4.62659	3.414983
bl	Equal variances assumed	4.007	0.05	2.247	64	0.028	4.08747	1.818815	0.453969	7.720971
	Equal variances not assumed			2.284	62.676	0.026	4.08747	1.789414	0.511251	7.663689
lo	Equal variances assumed	1.005	0.32	-0.479	58	0.634	-0.69173	1.443107	-3.58043	2.196958
	Equal variances not assumed			-0.486	57.739	0.629	-0.69173	1.423273	-3.541	2.15753
bao	Equal variances assumed	0.001	0.971	-2.099	53	0.041	-1.7019	0.810699	-3.32796	-0.07584
	Equal variances not assumed			-2.09	50.213	0.042	-1.7019	0.814457	-3.33761	-0.06619
FOB	Equal variances assumed	0.683	0.412	-4.033	52	0	-2.71778	0.673859	-4.06997	-1.36558
	Equal variances not assumed			-4.033	50.637	0	-2.71778	0.673859	-4.07084	-1.36471
ASB	Equal variances assumed	0.345	0.56	-0.868	44	0.39	-2.51043	2.89353	-8.34196	3.321093
	Equal variances not assumed			-0.868	35.54	0.391	-2.51043	2.89353	-8.38142	3.360554
ZMB	Equal variances assumed	0.387	0.536	0.793	55	0.431	1.955722	2.467439	-2.98914	6.90058
	Equal variances not assumed			0.786	51.592	0.435	1.955722	2.487499	-3.03675	6.948195
MOW	Equal variances assumed	0.587	0.447	3.322	54	0.002	6.376967	1.919378	2.528847	10.22509
	Equal variances not assumed			3.299	50.493	0.002	6.376967	1.932844	2.495673	10.25826
Circ	Equal variances assumed	0.295	0.59	0.062	42	0.951	0.4773	7.6762	-15.0139	15.9684
	Equal variances not assumed			0.062	41.493	0.951	0.4773	7.6762	-15.0195	15.974
SagittalArc	Equal variances assumed	3.475	0.07	0.125	38	0.901	0.8067	6.4586	-12.2681	13.8814
	Equal variances not assumed			0.115	22.841	0.909	0.8067	7.0025	-13.6847	15.2981
FroHArc	Equal variances assumed	0.498	0.483	-0.1	53	0.921	-0.2487	2.4853	-5.2335	4.7362
	Equal variances not assumed			-0.098	45.969	0.922	-0.2487	2.5284	-5.3382	4.8409
ParHArc	Equal variances assumed	1.386	0.244	1.891	63	0.063	3.9025	2.0635	-0.221	8.026
	Equal variances not assumed			1.895	62.338	0.063	3.9025	2.0591	-0.2133	8.0182
OccipHArc	Equal variances assumed	0.481	0.491	0.307	52	0.76	0.7331	2.3864	-4.0556	5.5218
	Equal variances not assumed			0.31	51.98	0.758	0.7331	2.3629	-4.0085	5.4747
LEyeCirc	Equal variances assumed	0.177	0.676	-0.613	60	0.542	-1.5396	2.5128	-6.566	3.4868
	Equal variances not assumed			-0.616	59.666	0.541	-1.5396	2.5013	-6.5436	3.4644
REyeCirc	Equal variances assumed	0.113	0.737	-0.446	61	0.657	-1.0974	2.4589	-6.0141	3.8194
	Equal variances not assumed			-0.453	60.987	0.652	-1.0974	2.4244	-5.9453	3.7506
EyeCircAvg	Equal variances assumed	0.344	0.56	-0.31	69	0.758	-0.73505	2.37117	-5.46541	3.99531
	Equal variances not assumed			-0.314	68.913	0.755	-0.73505	2.34137	-5.40607	3.93597

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
OccipArc	Equal variances assumed	0.068	0.795	-2.263	43	0.029	-4.9792	2.1999	-9.4157	-0.5426
	Equal variances not assumed			-2.257	41.682	0.029	-4.9792	2.2061	-9.4323	-0.5261
ParHArcleft	Equal variances assumed	2.681	0.107	0.676	58	0.502	1.1167	1.651	-2.1882	4.4215
	Equal variances not assumed			0.676	53.972	0.502	1.1167	1.651	-2.1935	4.4268
ParHArcright	Equal variances assumed	0.242	0.625	-0.008	55	0.994	-0.0123	1.6268	-3.2724	3.2478
	Equal variances not assumed			-0.008	54.019	0.994	-0.0123	1.6297	-3.2796	3.2549
ParHArcAvg	Equal variances assumed	2.743	0.103	0.362	63	0.719	0.54143	1.49692	-2.44992	3.53278
	Equal variances not assumed			0.36	58.333	0.72	0.54143	1.50284	-2.46646	3.54932
ParHCholeft	Equal variances assumed	4.935	0.03	0.399	57	0.691	0.495448	1.241379	-1.99037	2.981266
	Equal variances not assumed			0.401	52.35	0.69	0.495448	1.234319	-1.981	2.971897
ParHChoright	Equal variances assumed	0.118	0.733	-1.378	56	0.174	-1.64312	1.191993	-4.03097	0.74473
	Equal variances not assumed			-1.377	55.499	0.174	-1.64312	1.19303	-4.03352	0.747283
ParHChoaverage	Equal variances assumed	3.679	0.06	-0.383	63	0.703	-0.42896	1.120288	-2.66767	1.809758
	Equal variances not assumed			-0.381	56.883	0.705	-0.42896	1.125519	-2.68287	1.824954
ParBArcleft	Equal variances assumed	2.908	0.094	2.294	56	0.026	5.0464	2.1997	0.6399	9.453
	Equal variances not assumed			2.275	51.07	0.027	5.0464	2.2185	0.5927	9.5001
ParBArcright	Equal variances assumed	4.629	0.036	1.992	57	0.051	4.0588	2.0378	-0.0219	8.1394
	Equal variances not assumed			1.96	48.98	0.056	4.0588	2.0704	-0.1018	8.2193
ParBArcAvg	Equal variances assumed	4.533	0.037	2.394	61	0.02	4.84015	2.02218	0.79655	8.88375
	Equal variances not assumed			2.36	53.069	0.022	4.84015	2.05117	0.72615	8.95416
ParBCholeft	Equal variances assumed	1.907	0.173	1.649	57	0.105	3.174372	1.925508	-0.68139	7.030136
	Equal variances not assumed			1.63	51.672	0.109	3.174372	1.947577	-0.73432	7.083062
ParBChoright	Equal variances assumed	3.637	0.062	0.802	56	0.426	1.457952	1.818672	-2.18528	5.101189
	Equal variances not assumed			0.793	49.369	0.431	1.457952	1.837893	-2.23473	5.150639
ParBChoAvg	Equal variances assumed	3.372	0.071	1.483	61	0.143	2.654	1.790048	-0.92542	6.233422
	Equal variances not assumed			1.464	54.265	0.149	2.654	1.812617	-0.97967	6.287672
FroBCho	Equal variances assumed	0.013	0.909	0.353	53	0.725	1.0152	2.8749	-4.7512	6.7815
	Equal variances not assumed			0.347	42.493	0.73	1.0152	2.9243	-4.8843	6.9146
ftftoverzyzy	Equal variances assumed	7.657	0.009	1.707	35	0.097	0.037177	0.021781	-0.00704	0.081394
	Equal variances not assumed			1.829	23.086	0.08	0.037177	0.020327	-0.00486	0.079218
ftftoverAUB	Equal variances assumed	10.155	0.003	1.623	41	0.112	0.029786	0.018348	-0.00727	0.066841
	Equal variances not assumed			1.592	23.976	0.124	0.029786	0.018706	-0.00882	0.068396
ftftoverecec	Equal variances assumed	1.315	0.256	-1.62	55	0.111	-0.02176	0.013433	-0.04868	0.005161
	Equal variances not assumed			-1.628	51.972	0.11	-0.02176	0.013367	-0.04858	0.005064
nnsovergop	Equal variances assumed	2.87	0.097	-3.379	48	0.001	-0.02621	0.007758	-0.04181	-0.01061
	Equal variances not assumed			-3.47	46.615	0.001	-0.02621	0.007552	-0.04141	-0.01101
nnsovereueu	Equal variances assumed	0.236	0.629	-1.066	44	0.292	-0.01427	0.013382	-0.04124	0.012699
	Equal variances not assumed			-1.066	43.977	0.292	-0.01427	0.013382	-0.04124	0.012699

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
nnsovercirc	Equal variances assumed	1.025	0.317	-2.054	41	0.046	-0.00661	0.00322	-0.01312	-0.00011
	Equal variances not assumed			-2.067	39.236	0.045	-0.00661	0.0032	-0.01309	-0.00014
ececoverzyzy	Equal variances assumed	3.322	0.077	4.413	36	0	0.046725	0.010588	0.025251	0.068199
	Equal variances not assumed			4.761	27.961	0	0.046725	0.009814	0.02662	0.06683
ececoverbapr	Equal variances assumed	0.325	0.573	0.902	34	0.373	0.023869	0.026452	-0.02989	0.077626
	Equal variances not assumed			0.902	33.411	0.373	0.023869	0.026452	-0.02992	0.077661
ececoverdd	Equal variances assumed	0.053	0.819	-2.812	56	0.007	-0.38418	0.136599	-0.65782	-0.11054
	Equal variances not assumed			-2.815	55.881	0.007	-0.38418	0.136483	-0.6576	-0.11076
ddoverftft	Equal variances assumed	0.005	0.946	3.082	65	0.003	0.017168	0.00557	0.006044	0.028293
	Equal variances not assumed			3.073	63.391	0.003	0.017168	0.005587	0.006004	0.028333
ddoverMOW	Equal variances assumed	0.025	0.875	-0.3	54	0.765	-0.00404	0.013444	-0.03099	0.022915
	Equal variances not assumed			-0.3	53.772	0.765	-0.00404	0.01344	-0.03099	0.02291
CircoverGOP	Equal variances assumed	0.784	0.381	-1.191	41	0.241	-0.02365	0.019869	-0.06378	0.016472
	Equal variances not assumed			-1.196	40.188	0.239	-0.02365	0.01978	-0.06362	0.016316
fmtoverLeyecirc	Equal variances assumed	2.13	0.15	0.64	57	0.524	0.006969	0.010883	-0.01482	0.028762
	Equal variances not assumed			0.637	49.701	0.527	0.006969	0.010949	-0.01503	0.028964
dfmtavgoverbab	Equal variances assumed	1.934	0.171	0.216	43	0.83	0.002767	0.012811	-0.02307	0.028602
	Equal variances not assumed			0.22	25.682	0.827	0.002767	0.012565	-0.02308	0.028611
dfmtavgoverAUB	Equal variances assumed	0.093	0.762	2.808	44	0.007	0.016503	0.005876	0.00466	0.028346
	Equal variances not assumed			2.836	43.243	0.007	0.016503	0.005819	0.004769	0.028237
dfmtavgoverftft	Equal variances assumed	0.703	0.405	-2.56	65	0.013	-0.01073	0.004193	-0.01911	-0.00236
	Equal variances not assumed			-2.573	64.968	0.012	-0.01073	0.004171	-0.01906	-0.0024
dfmtavgoverecec	Equal variances assumed	0.114	0.737	-2.357	56	0.022	-0.00992	0.004209	-0.01835	-0.00149
	Equal variances not assumed			-2.367	55.915	0.021	-0.00992	0.004193	-0.01832	-0.00152
dfmtavgovercirc	Equal variances assumed	0.009	0.923	1.734	42	0.09	0.00235	0.001355	-0.00039	0.005085
	Equal variances not assumed			1.734	41.833	0.09	0.00235	0.001355	-0.00039	0.005085
nprovergop	Equal variances assumed	1.688	0.2	-2.69	45	0.01	-0.02632	0.009787	-0.04604	-0.00661
	Equal variances not assumed			-2.733	44.388	0.009	-0.02632	0.009632	-0.04573	-0.00692
nprovereueu	Equal variances assumed	2.469	0.124	-0.244	40	0.808	-0.00448	0.018356	-0.04158	0.032617
	Equal variances not assumed			-0.246	39.702	0.807	-0.00448	0.018193	-0.04126	0.032296
eyecircovercirc	Equal variances assumed	0.032	0.86	0.668	42	0.508	0.002583	0.003866	-0.00522	0.010384
	Equal variances not assumed			0.668	41.477	0.508	0.002583	0.003866	-0.00522	0.010387
dfmtoverzyzy	Equal variances assumed	0.499	0.484	2.315	38	0.026	0.014359	0.006203	0.001802	0.026915
	Equal variances not assumed			2.46	37.605	0.019	0.014359	0.005838	0.002537	0.026181
nproversagarc	Equal variances assumed	0.632	0.432	-2.944	34	0.006	-0.01874	0.006366	-0.03168	-0.0058
	Equal variances not assumed			-2.844	24.699	0.009	-0.01874	0.00659	-0.03232	-0.00516
nprovercirc	Equal variances assumed	0.284	0.598	-1.136	37	0.263	-0.00468	0.004117	-0.01302	0.003665
	Equal variances not assumed			-1.133	36.367	0.264	-0.00468	0.004125	-0.01304	0.003688

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
eyecircoverecec	Equal variances assumed	7.285	0.009	-4.066	54	0	-0.05738	0.014113	-0.08568	-0.02909
	Equal variances not assumed			-3.998	42.232	0	-0.05738	0.014353	-0.08634	-0.02842
nproverAUB	Equal variances assumed	0.361	0.552	-1.834	39	0.074	-0.02757	0.015037	-0.05799	0.002843
	Equal variances not assumed			-1.831	38.602	0.075	-0.02757	0.015057	-0.05804	0.002892
dfmtovereyecircavg	Equal variances assumed	1.777	0.187	2.365	69	0.021	0.006462	0.002732	0.00101	0.011913
	Equal variances not assumed			2.327	60.854	0.023	0.006462	0.002777	0.000908	0.012015
dfmtoverAUB	Equal variances assumed	0.093	0.762	2.808	44	0.007	0.016503	0.005876	0.00466	0.028346
	Equal variances not assumed			2.836	43.243	0.007	0.016503	0.005819	0.004769	0.028237
eyecircoverAUB	Equal variances assumed	0.053	0.82	1.473	44	0.148	0.026066	0.017699	-0.0096	0.061737
	Equal variances not assumed			1.472	43.625	0.148	0.026066	0.017702	-0.00962	0.061752
ftftoverZMB	Equal variances assumed	0.527	0.471	1.477	55	0.145	0.025477	0.017249	-0.00909	0.060046
	Equal variances not assumed			1.486	54.996	0.143	0.025477	0.017143	-0.00888	0.059832
ftftoverFroBCho	Equal variances assumed	0.347	0.558	5.084	52	0	0.073681	0.014493	0.044598	0.102764
	Equal variances not assumed			5.305	48.374	0	0.073681	0.013889	0.045761	0.101601
eyecircoverfmt	Equal variances assumed	1.549	0.218	-0.553	59	0.582	-0.00909	0.016422	-0.04195	0.023772
	Equal variances not assumed			-0.545	50.35	0.588	-0.00909	0.016687	-0.0426	0.024422
dfmttoftft	Equal variances assumed	0.703	0.405	-2.56	65	0.013	-0.01073	0.004193	-0.01911	-0.00236
	Equal variances not assumed			-2.573	64.968	0.012	-0.01073	0.004171	-0.01906	-0.0024
nproverASB	Equal variances assumed	0.87	0.357	-0.987	38	0.33	-0.04038	0.040926	-0.12324	0.042467
	Equal variances not assumed			-1.023	27.551	0.315	-0.04038	0.039494	-0.12134	0.040575
pararcoversagarc	Equal variances assumed	0.115	0.737	2.974	37	0.005	0.012602	0.004238	0.004016	0.021189
	Equal variances not assumed			2.968	29.671	0.006	0.012602	0.004246	0.003926	0.021279
eyecircoversagarc	Equal variances assumed	0.001	0.978	-1.09	36	0.283	-0.0065	0.005964	-0.0186	0.005595
	Equal variances not assumed			-1.088	27.157	0.286	-0.0065	0.005977	-0.01876	0.005759
ftftoverbl	Equal variances assumed	0.514	0.476	1.364	55	0.178	0.022562	0.016537	-0.01058	0.055703
	Equal variances not assumed			1.368	54.812	0.177	0.022562	0.016494	-0.0105	0.055619
ftftoverecm	Equal variances assumed	0.508	0.479	0.467	58	0.642	0.018101	0.038741	-0.05945	0.09565
	Equal variances not assumed			0.459	44.246	0.648	0.018101	0.039401	-0.06129	0.097496
nproverzyzy	Equal variances assumed	2.964	0.094	-1.91	36	0.064	-0.02421	0.012671	-0.0499	0.001493
	Equal variances not assumed			-1.855	29.219	0.074	-0.02421	0.013051	-0.05089	0.002479
nproverftft	Equal variances assumed	0.302	0.585	-3.687	55	0.001	-0.06723	0.018233	-0.10377	-0.03069
	Equal variances not assumed			-3.691	54.578	0.001	-0.06723	0.018214	-0.10373	-0.03072
nproeverfmt	Equal variances assumed	11.749	0.001	-1.742	54	0.087	-0.03479	0.019969	-0.07482	0.005246
	Equal variances not assumed			-1.676	37.759	0.102	-0.03479	0.020756	-0.07682	0.007237
nproverdfmt	Equal variances assumed	0.253	0.617	-2.959	61	0.004	-0.12332	0.041678	-0.20666	-0.03998
	Equal variances not assumed			-2.973	61	0.004	-0.12332	0.041482	-0.20627	-0.04037
nproverecec	Equal variances assumed	0.042	0.838	-3.701	51	0.001	-0.0725	0.019587	-0.11182	-0.03317
	Equal variances not assumed			-3.703	50.997	0.001	-0.0725	0.019576	-0.1118	-0.03319

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
nprovernb	Equal variances assumed	3.965	0.052	-1.407	51	0.165	-0.0233	0.016554	-0.05653	0.009938
	Equal variances not assumed			-1.383	43.593	0.174	-0.0233	0.016845	-0.05725	0.010663
nprovereyecirc	Equal variances assumed	0.083	0.775	-1.989	61	0.051	-0.02699	0.01357	-0.05413	0.000143
	Equal variances not assumed			-1.998	60.999	0.05	-0.02699	0.013508	-0.054	2E-05
nproverFroBCho	Equal variances assumed	0.475	0.494	-0.928	46	0.358	-0.01506	0.016227	-0.04772	0.017602
	Equal variances not assumed			-0.9	36.326	0.374	-0.01506	0.016725	-0.04897	0.018849
nproverParHArc	Equal variances assumed	2.153	0.148	-1.953	52	0.056	-0.03374	0.017278	-0.06841	0.000929
	Equal variances not assumed			-1.966	51.386	0.055	-0.03374	0.017159	-0.06818	0.000699
ftftoverGOP	Equal variances assumed	0.268	0.607	2.587	44	0.013	0.023986	0.009271	0.005301	0.04267
	Equal variances not assumed			2.61	43.5	0.012	0.023986	0.009191	0.005456	0.042515
ftftoverbapr	Equal variances assumed	2.117	0.155	-0.585	35	0.563	-0.0673	0.115143	-0.30106	0.166451
	Equal variances not assumed			-0.6	19.564	0.556	-0.0673	0.112235	-0.30176	0.167151
ftftoverpralv	Equal variances assumed	0.009	0.924	0.584	58	0.562	0.042738	0.073208	-0.1038	0.189279
	Equal variances not assumed			0.582	56.369	0.563	0.042738	0.073463	-0.1044	0.189881
ftftoverdec	Equal variances assumed	0.349	0.557	4.569	61	0	0.141946	0.031068	0.079822	0.204071
	Equal variances not assumed			4.559	59.284	0	0.141946	0.031138	0.079647	0.204246
ftftoverdfmt	Equal variances assumed	0.202	0.655	2.526	65	0.014	0.070305	0.027833	0.014718	0.125892
	Equal variances not assumed			2.528	64.629	0.014	0.070305	0.027814	0.01475	0.125859
ftftoverMOW	Equal variances assumed	1.568	0.216	-3.332	54	0.002	-0.17228	0.051704	-0.27594	-0.06862
	Equal variances not assumed			-3.374	50.21	0.001	-0.17228	0.051062	-0.27483	-0.06973
ftftovercirc	Equal variances assumed	0.015	0.903	3.297	40	0.002	0.011373	0.003449	0.004401	0.018344
	Equal variances not assumed			3.307	39.95	0.002	0.011373	0.003439	0.004422	0.018323
ftftovereyecirc	Equal variances assumed	1.047	0.31	4.12	60	0	0.041968	0.010186	0.021593	0.062343
	Equal variances not assumed			4.154	58.048	0	0.041968	0.010104	0.021744	0.062192
ftftoverParHArc	Equal variances assumed	0.302	0.585	1.606	55	0.114	0.025132	0.015645	-0.00622	0.056484
	Equal variances not assumed			1.614	54.141	0.112	0.025132	0.01557	-0.00608	0.056347
nnsovereyecirc	Equal variances assumed	0.036	0.85	-2.651	67	0.01	-0.02773	0.010459	-0.0486	-0.00685
	Equal variances not assumed			-2.647	65.15	0.01	-0.02773	0.010475	-0.04865	-0.00681

Appendix 11: Actual and Predicted Ages for Linear Regression and Stepwise Regression

Table 13: Comparison of Actual Age and Age Predicted Using the Long Equation for Cranial Ratios

Cranial Ratios		
Actual Age	Predicted Age	Difference
18	18	0
19	19	0
20	20	0
15	15	0
11	11	0
20	20	0
19	19	0
15	15	0
11	11	0
18	18	0
16	16	0
12	12	0
4	4	0
16	16	0
10	10	0
8	8	0
13	13	0
14	14	0

Table 14: Comparison of Actual Age and Predicted Age Using Step Wise Equations #1, #2, and #3 for Cranial Ratios

Step Wise Equation #1			Step Wise Equation #2			Step Wise Equation #3		
Actual Age	Predicted Age	Difference	Actual Age	Predicted Age	Difference	Actual Age	Predicted Age	Difference
2	6.060967742	-4.060968	2	7.850248252	-5.850	18	17.12527098	0.875
2	7.728677043	-5.728677	4	3.299186704	0.701	19	17.86393786	1.136
4	3.410253237	0.5897468	5	10.0458678	-5.046	14	18.05752681	-4.058
4	6.135661743	-2.135662	5	6.746016263	-1.746	15	20.22035463	-5.220
5	9.592983051	-4.592983	8	13.23654576	-5.237	13	14.1888925	-1.189
5	12.958	-7.958	8	9.026292943	-1.026	20	19.51961109	0.480
5	6.138636653	-1.138637	10	9.717474483	0.283	15	16.92169932	-1.922
5	8.591339259	-3.591339	11	11.30524127	-0.305	5	10.12801294	-5.128
6	8.499021898	-2.499022	11	11.17000287	-0.170	11	11.49481276	-0.495
8	12.79270306	-4.792703	11	14.36995667	-3.370	20	20.90372976	-0.904
8	9.297313083	-1.297313	12	12.00732825	-0.007	19	19.1827734	-0.183
8	9.497901069	-1.497901	12	11.11423379	0.886	15	14.79528944	0.205
10	10.10951461	-0.109515	13	13.97406243	-0.974	11	11.32402917	-0.324
11	10.92173333	0.0782667	13	13.20986304	-0.210	18	18.19692814	-0.197
11	10.76805283	0.2319472	14	17.73753065	-3.738	19	17.90547146	1.095
11	14.69829767	-3.698298	14	13.71358122	0.286	19	12.80334341	6.197
12	12.36741147	-0.367411	15	19.90518424	-4.905	11	14.47410727	-3.474
12	10.40773453	1.5922655	15	16.67063571	-1.671	16	16.83751585	-0.838
13	14.73510545	-1.735105	15	14.65704672	0.343	16	16.96946185	-0.969
13	13.04095901	-0.040959	15	15.9161658	-0.916	12	12.14052258	-0.141
14	17.3880458	-3.388046	15	14.30449603	0.696	18	18.66290842	-0.663
14	13.35943543	0.6405646	16	16.51885501	-0.519	18	15.91510708	2.085
15	20.06125581	-5.061256	16	16.76369554	-0.764	8	13.46583981	-5.466
15	16.29202817	-1.292028	16	16.58568368	-0.586	18	14.51998996	3.480
15	15.60898868	-0.608989	17	16.22798239	0.772	17	16.68973784	0.310
15	15.7313952	-0.731395	18	16.88626233	1.114	4	3.222818223	0.777
15	14.50878176	0.4912182	18	17.6641732	0.336	18	13.87110766	4.129
16	16.55120989	-0.55121	18	18.32292987	-0.323	5	6.897519156	-1.898
16	17.14290822	-1.142908	18	15.65997777	2.340	20	15.88223389	4.118
16	16.87245474	-0.872455	18	14.2608025	3.739	16	16.83731959	-0.837
16	17.16770931	-1.167709	18	13.7383685	4.262	10	9.780616468	0.219
17	15.3242823	1.6757177	19	17.65612134	1.344	12	11.23103254	0.769
18	16.776	1.224	19	19.09868232	-0.099	8	9.077102605	-1.077
18	16.35177778	1.6482222	19	17.53223897	1.468	20	17.20803139	2.792
18	17.61811099	0.381889	19	12.49522385	6.505	13	13.43668668	-0.437
18	15.57907682	2.4209232	20	19.30410032	0.696	14	13.8602364	0.140
18	14.08031442	3.9196856	20	20.50496665	-0.505	15	16.21540567	-1.215
18	13.58817095	4.4118291	20	15.63476524	4.365	15	14.39979448	0.600
19	17.21995349	1.7800465	20	17.02824233	2.972			
19	20.31932374	-1.319324						
19	17.36991111	1.6300889						
19	12.15192159	6.8480784						
20	19.77166154	0.2283385						
20	19.47105882	0.5289412						
20	16.43238	3.56762						
20	17.48597313	2.5140269						

Table 15: Comparison of Actual Age and Predicted Age Using Step Wise Equations #4, #5, and #6 for Cranial Ratios

Step Wise Equation #4			Step Wise Equation #5			Step Wise Equation #6		
Actual Age	Predicted Age	Difference	Actual Age	Predicted Age	Difference	Actual Age	Predicted Age	Difference
18	17.09658168	0.903	18	17.04662232	0.953	18	17.57162562	0.428
19	18.45236912	0.548	19	18.96907674	0.031	19	19.21432519	-0.214
14	18.15427731	-4.154	14	18.11272763	-4.113	14	17.71009157	-3.710
15	19.68567714	-4.686	15	19.18945375	-4.189	15	18.28296371	-3.283
13	14.69601475	-1.696	20	20.04022284	-0.040	20	20.03227308	-0.032
20	20.06376961	-0.064	15	16.84523558	-1.845	15	16.91457741	-1.915
15	16.96153568	-1.962	5	9.520543327	-4.521	11	11.22673991	-0.227
5	9.621483827	-4.621	11	11.44849027	-0.448	20	20.2275004	-0.228
11	11.55382796	-0.554	20	20.52378955	-0.524	19	19.0415244	-0.042
20	20.54443167	-0.544	19	19.13489296	-0.135	15	14.90936552	0.091
19	18.90024608	0.100	15	15.07295535	-0.073	11	11.26626988	-0.266
15	15.41326042	-0.413	11	11.0548333	-0.055	18	17.99195394	0.008
11	11.19978908	-0.200	18	18.07804733	-0.078	19	16.57490523	2.425
18	18.26467259	-0.265	19	16.75925029	2.241	19	19.80593747	-0.806
19	16.98328317	2.017	19	17.32551749	1.674	16	16.34939112	-0.349
19	12.31555636	6.684	16	16.056018	-0.056	16	17.29043019	-1.290
16	16.35205126	-0.352	16	17.33262002	-1.333	12	11.84773052	0.152
16	17.39087289	-1.391	12	12.06970832	-0.070	18	19.06414134	-1.064
12	11.4040097	0.596	18	18.82048354	-0.820	17	16.61346757	0.387
18	18.76873904	-0.769	18	15.84160014	2.158	4	3.545089646	0.455
18	15.79343886	2.207	17	16.64731069	0.353	18	13.23836021	4.762
8	13.03937841	-5.039	4	3.650550301	0.349	5	6.179256498	-1.179
18	13.73069031	4.269	18	13.39901686	4.601	20	14.34331202	5.657
17	16.6135396	0.386	5	6.562711877	-1.563	16	16.34238324	-0.342
4	3.490625624	0.509	20	15.07407847	4.926	10	10.17857482	-0.179
18	13.56218279	4.438	16	16.52604709	-0.526	8	8.494298676	-0.494
5	6.994713212	-1.995	10	9.811915516	0.188	20	17.06242902	2.938
20	15.57400183	4.426	12	10.88863627	1.111	13	12.83373037	0.166
16	16.77284677	-0.773	8	8.49223758	-0.492	14	14.58170034	-0.582
10	9.653833857	0.346	20	17.13444932	2.866	15	13.89490309	1.105
12	11.06566653	0.934	13	12.96496881	0.035			
8	8.919788466	-0.920	14	14.731668	-0.732			
20	17.20507077	2.795	15	14.49691667	0.503			
13	13.23700224	-0.237						
14	14.51289623	-0.513						
15	14.7110531	0.289						

Table 16: Comparison of Actual Age and Predicted Age Using Step Wise Equation #7 for Cranial Ratios

Step Wise Equation #7		
Actual Age	Predicted Age	Difference
18	17.71504	0.28496
19	19.18199	-0.18199
14	17.62948	-3.62948
15	18.35779	-3.35779
20	19.95846	0.04154
15	14.93716	0.06284
11	10.93149	0.06851
20	20.08428	-0.08428
19	19.15027	-0.15027
15	14.8616	0.1384
11	11.37601	-0.37601
18	17.85953	0.14047
19	16.00494	2.99506
19	20.41994	-1.41994
16	16.03625	-0.03625
12	11.91319	0.08681
17	16.02936	0.97064
4	3.8148	0.1852
5	5.80591	-0.80591
20	14.31669	5.68331
16	15.93071	0.06929
10	9.87543	0.12457
8	8.40298	-0.40298
20	16.84386	3.15614
13	12.77866	0.22134
14	14.19217	-0.19217

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